

TRAFFIC QUALITY ON THE ATLANTA REGIONAL HIGHWAY SYSTEM

(FALL 2001)

FINAL REPORT



**Prepared by
Skycomp, Inc., (Columbia, Maryland)
for the Georgia Department of Transportation**



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EXECUTIVE SUMMARY

Fall 2001 freeway traffic conditions, and changes since 1998

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Fall 2001 freeway traffic conditions, and changes since 1998

During the fall of 1998, approximately 500 (centerline) miles of freeways and arterial highways were surveyed in the Atlanta metropolitan area. The method of data capture was overlapping aerial photography, repeated over four morning and four evening commuter survey periods. The output of the survey was a comprehensive assessment of how daily traffic was typically flowing on each surveyed facility.

This survey was repeated in the fall of 2001 using an identical methodology. The purpose of this Executive Summary is to compare the results of the 1998 and 2001 surveys with regard to the locations where traffic congestion was found during the peak periods of commuter travel.

Many of the aerial photographs from which these findings were derived have been provided in interactive CD-ROM slide shows; these products include not only highlight congestion photographs, but also 100% overlapping coverage of each freeway, repeated during both morning and evening peak-hour periods. A digital copy of the final 2001 report has also been provided on the CD-ROM.

For further information about this survey program, or to acquire copies of the CD-ROMs, please contact Skycomp, Inc. at 410-884-6900.

I-20

Morning:

(Between SR 92 and the Perimeter)

During the 1998 and 2001 surveys, eastbound congestion was found on I-20 approaching two separate lane drops (4 lanes to 3) at Six Flags Dr and Fulton Industrial Blvd. During the 2001 survey, the duration and extent of congestion recorded was greater than that found during the 1998 survey; during the peak period, the tail of the queue was found approximately seven miles upstream in the vicinity of Lee Rd (vs. a 4 mile queue in 1998).

(Inside the Perimeter)

During the 1998 and 2001 surveys, westbound congestion was found on I-20 approaching the I-75 Interchange; during the peak period, congestion typically extended four miles upstream to the vicinity of Glenwood Ave; during the peak period, average speeds normally ranged from 30 to 50 mph.

During the 1998 and 2001 surveys, a short zone of eastbound congestion was found on I-20 between Martin Luther King Dr and Langham St; average estimated speeds typically ranged from 25 to 45 mph. No apparent cause was found for the congestion; however, roadway geometrics (curves) and low sun angle may have contributed.

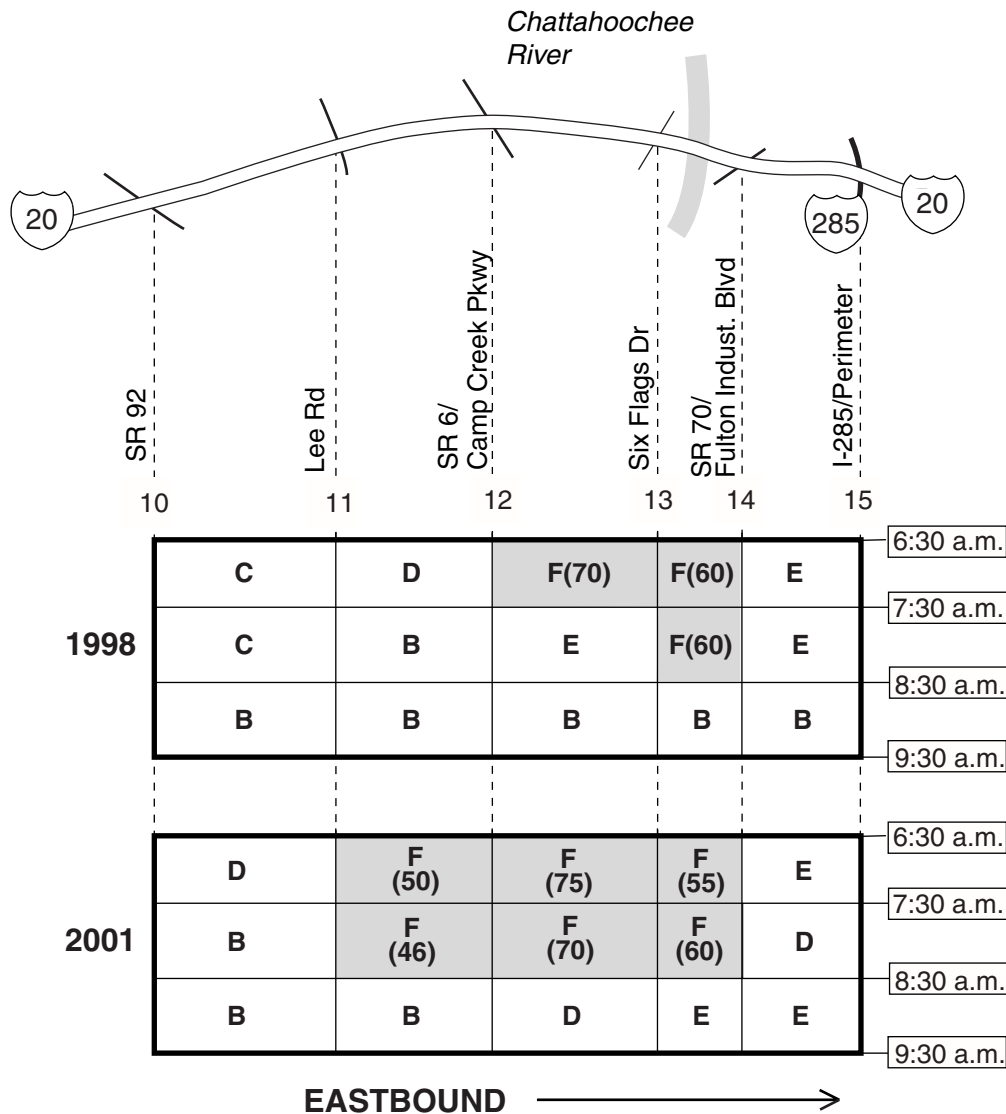
During the 1998 and 2001 surveys, westbound congestion was found on I-20 approaching the Panola Dr and Wesley Chapel Rd; mainline congestion appeared to be caused by traffic entering at these Interchanges. In 1998, a three-mile zone of congestion was typically found at this location during the peak period; during the 2001 survey, congestion typically extended back to the Interchange at Evans Mill Rd (a distance of approximately six miles).

Evening:

(Between SR 92 and the Perimeter)

During the 1998 survey, intermittent westbound congestion was found on I-20 approaching the lane drop (4 lane to 3) at Camp Creek Pkwy; during the 2001 survey, congestion was consistently found at this location during the peak period.

I-20 (Between SR 92 & I -285) Morning (Fall 2001 vs Fall 1998)

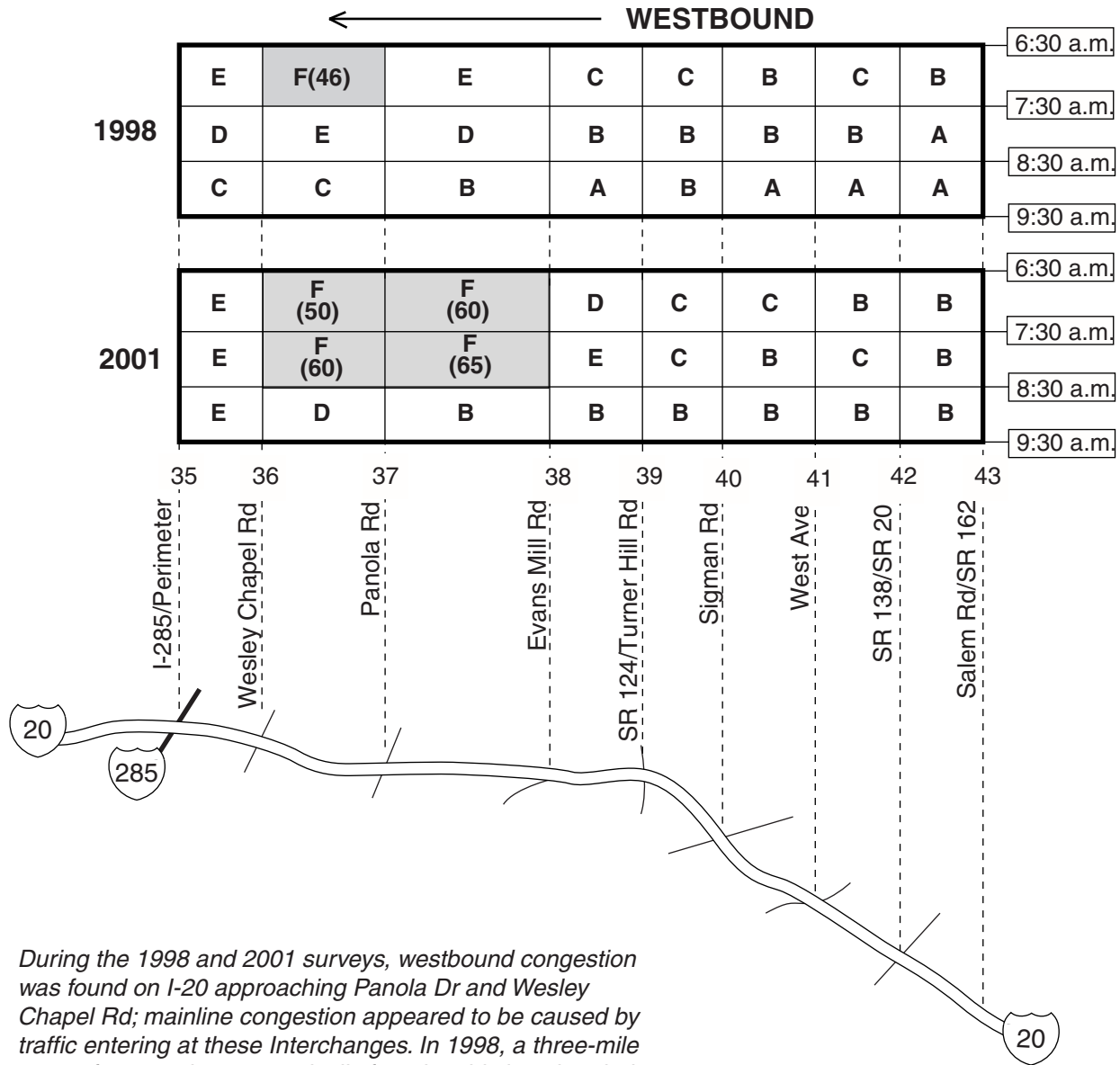


LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED	SEVERE
A	B	C	D	E	F	F	F
0	10	20	30	45	65		
Density scale (cars per lane-mile)							
Note: F (60) in the tables means level-of-service "F", with density = 60							

(Between SR 92 and the Perimeter)
During the 1998 and 2001 surveys, eastbound congestion was found on I-20 approaching two separate lane drops (4 lanes to 3) at Six Flags Dr and Fulton Industrial Blvd. During the 2001 survey, the duration and extent of congestion recorded was greater than that found during the 1998 survey; during the peak period, the tail of the queue was found approximately seven miles upstream in the vicinity of Lee Rd.

I-20 (Between I-285 & Salem Rd) Morning (Fall 1998 VS Fall 2001)



During the 1998 and 2001 surveys, westbound congestion was found on I-20 approaching Panola Dr and Wesley Chapel Rd; mainline congestion appeared to be caused by traffic entering at these Interchanges. In 1998, a three-mile zone of congestion was typically found at this location during the peak period; during the 2001 survey, congestion typically extended back to the Interchange at Evans Mill Rd (a distance of approximately six miles).

LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE
A	B	C	D	E	F	F		F
0	10	20	30	45	65			

Density scale (cars per lane-mile)

Note: F (60) in the tables means level-of-service "F", with density = 60

(Inside the Perimeter and east to Salem Rd)

During the 1998 evening survey, a short zone of eastbound congestion was found on I-20 approaching the interchange at Wesley Chapel Rd; the tail of the queue was typically found approximately one mile upstream at the Perimeter Interchange. During the survey in 2001, congestion approaching Wesley Chapel Rd typically extended back through the Perimeter Interchange to the vicinity of Candler Rd (a distance of approximately three miles).

I-20 HOV

Morning and Evening:

(Between Boulevard and the Perimeter)

No congestion was found on the I-20 HOV facility during the morning and evening survey periods in 1998 and 2001.

US 41 / 19 (Tara Blvd)

Morning:

(Between I-75 and Main St; Clayton Co.)

No level-of-service "F" conditions were found on US 41 / 19 during the morning survey period.

Evening:

(Between I-75 and Jonesboro Rd)

No level-of-service "F" conditions were found on US 41 / 19 during the evening survey period.

I-75

Morning:

(Between Glade Rd and I-85)

During the surveys in 1998, construction at the Perimeter Interchange was the primary bottleneck for southbound travelers on this section of I-75; during the peak period, congestion typically extended back to the vicinity of the I-575 Interchange (10 miles). During the 2001 morning surveys, a ten-mile zone of southbound congestion was typically found between the vicinity of SR 92 and S. Marietta Pkwy; the primary bottleneck was located where traffic entered at the Canton Rd Connector Interchange. Average speeds approaching this interchange during the peak period typically ranged from 20 to 40 mph. While congestion persisted south of Canton Rd Connector to the Interchange at S. Marietta Pkwy, average speeds typically improved (35 to 45 mph).

(Between the I-85 Interchanges)

During the morning survey period in 1998 and 2001, a three to four mile zone of severe northbound congestion was found on I-75 between the vicinity of Lakewood Freeway (SR 166) and I-20; during the peak period, average estimated speeds typically ranged from 15 to 30 mph. While congestion persisted several miles north of I-20, traffic flow typically improved, with average estimated speeds of 35 to 50 mph.

In the southbound direction, a short zone of southbound congestion was found between 10th Street and North Ave; average speeds typically ranged from 40 to 50 mph. This congestion was found during the morning surveys in 1998 and 2001.

(Between I-85 and Jonesboro Rd)

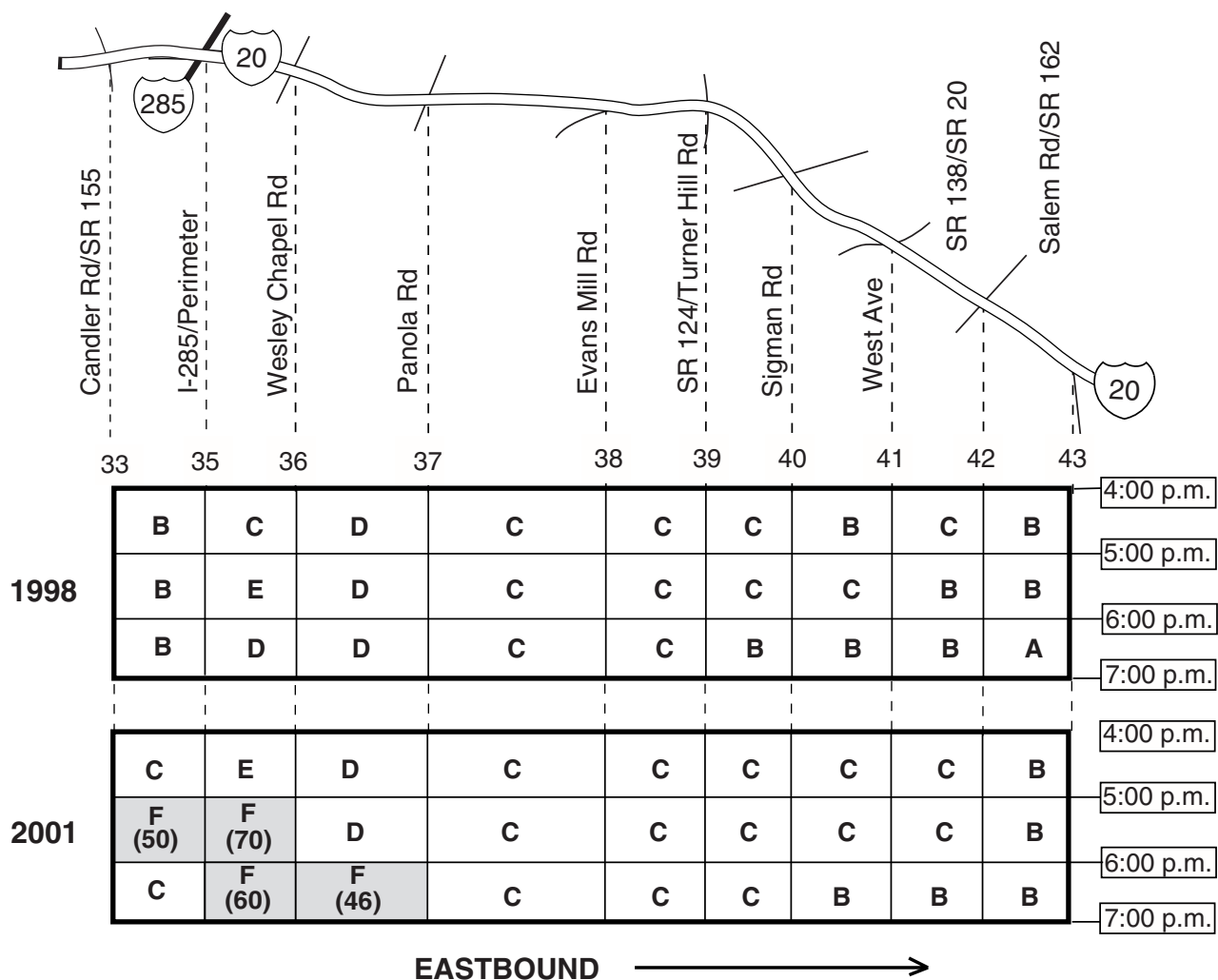
Early in the survey period in 1998, a one to two mile zone of northbound congestion was typically found on I-75 approaching the Perimeter Interchange; similar congestion was found during the morning surveys in 2001.

Evening:

(Between Glade Rd and I-85)

During the evening surveys in 1998, a three-mile zone of northbound congestion was found on I-75 approaching the construction zone at the Perimeter. Congestion was not found at this location during the evening surveys in 2001. North of the Perimeter, congestion during the 1998 surveys was typically found between Windy Hill Rd and N. Marietta Pkwy (a distance of five miles). Similar

I-20 (Between Candler Rd & Salem Rd) EVENING (Fall 1998 vs. Fall 2001)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED	SEVERE
A	B	C	D	E	F	F	F
0	10	20	30	45	65		
Density scale (cars per lane-mile)							

Note: F (60) in the tables means level-of-service "F", with density = 60

During the 1998 evening survey, a short zone of eastbound congestion was found on I-20 approaching the interchange at Wesley Chapel Rd; the tail of the queue was typically found approximately one mile upstream at the Perimeter Interchange. During the survey in 2001, congestion approaching Wesley Chapel Rd typically extended back through the Perimeter Interchange to the vicinity of Candler Rd (a distance of approximately three miles).

congestion was found during the 2001 surveys; however, congestion typically persisted farther north to Canton Rd Connector (another two miles), and farther south to the Perimeter. Average speeds typically ranged from 30 to 45 mph.

(Between the I-85 Interchanges)

During the evening survey period in 1998 and 2001, a four-mile zone of severe southbound congestion was found on I-75 between the Interchanges at I-85 and I-20; average estimated speeds during the peak period typically ranged from 15 to 30 mph. During the 2001 survey, congestion appeared to be more severe earlier in the survey period (4:00 to 5:00 p.m.).

(Between I-85 and Jonesboro Rd)

During the evening surveys in 1998 and 2001, a short zone of southbound congestion was found on I-75 where traffic entered from the Perimeter; otherwise, traffic flowed freely along on this section of I-75.

I-75 HOV

Morning:

(Inside the Perimeter)

During the morning surveys in 1998 and 2001, a three to four mile zone of northbound congestion was found in HOV lane between the interchanges at I-85 and I-20; average speeds were estimated at 40 to 50 mph.

Evening:

(Inside the Perimeter)

During the evening surveys in 1998 and 2001, a one to two mile zone of southbound congestion was found in the HOV lane between the Interchanges at I-85 and North Ave; average speeds were estimated at 30 to 50 mph.

US 78 (Stone Mountain Freeway)

Morning:

(Between the Perimeter and Grayson Rd)

Traveling westbound, the first signal that generated significant congestion was found at Wisteria Dr; during the peak period in 2001, congestion typically extended back through one or two upstream signals. At its maximum observed extent, the tail of the queue extended back to the vicinity of Grayson Pkwy (a distance of approximately one mile). During the 1998 survey, only minor intermittent congestion was found at Wisteria Dr.

Continuing westbound, the next major queue was found at Park Place Blvd; during the peak period, congestion typically extended back through the upstream signal at Parker Ct. At its maximum observed extent, the tail of the queue was found approximately one mile upstream of the signal. While congestion was found at Park Place Blvd in 1998, congestion was not as extensive.

During the 1998 and 2001 surveys, similar congestion was found on the freeway section of US 78 approaching the Perimeter Interchange; congestion was typically found between the Perimeter and Hugh Howell Rd (a distance of six miles). Average speeds typically ranged from 30 to 50 mph; however, congestion was more severe in the right lane closer to the Perimeter.

Evening:

(Between the Perimeter and Grayson Rd)

During the 2001 survey, a one-mile zone of eastbound congestion was found on Stone Mountain Freeway between the Perimeter and Cooledge Rd; average estimated speeds ranged from 35 to 45 mph. This congestion was not found during the survey in 1998.

East of Cooledge Dr, traffic typically flowed freely until the end of the freeway section.

The first signal queue was typically encountered at Park Place Blvd, with congestion also found farther east at Killian Hill Rd, Centerville Hwy and Wisteria Dr. Similar congestion was found along this corridor during the survey in 1998.

I-85

Morning:

(Between SR 20 and I-75)

During the 1998 and 2001 surveys, a six to seven mile zone of southbound congestion was found on I-85 between the vicinity of SR 316 and Indian Trail Rd; average estimated speeds ranged widely, from 25 to 45 mph. The head of the queue was found where traffic entered at the closely spaced ramps at Pleasant Hill Rd and Steve Reynolds Blvd.

Farther south, congestion was found approaching the I-75 Interchange; during the surveys in 1998 and 2001, the tail of this queue was typically found approximately one to two miles upstream in the vicinity of Druid Hills Rd.

(Between I-75 and SR 74 (Senoia Rd))

During the peak period in 1998, a short zone of northbound congestion was found on I-85 at the I-75 Interchange; the head of the queue was on the two-lane flyover ramp where traffic typically merged into congested flow on I-75. This congestion was not found during the morning surveys in 2001; northbound traffic on I-75 typically flowed at free flow speeds at this location, which may have accounted for the absence of congestion on the flyover ramp.

(Between SR 74 and US 29)

No congestion was found on this section of I-85 during the morning survey period in 1998 and 2001.

Evening:

(Between SR 20 and I-75)

Throughout the evening survey period in 1998, a five-mile zone of northbound congestion was typically found on I-85 between the Perimeter and the vicinity of Indian Trail Rd; average estimated speeds ranged from 25 to 45 mph. During the evening surveys in 2001, construction related to the new HOV facility affected traffic flow along this corridor. While no lanes were closed during the survey period, pavement rehabilitation located just before the interchange at Jimmy Carter Blvd caused upstream congestion. Average speeds along this section of I-85 varied widely, from stop-and-go to free flow.

In the southbound direction, intermittent congestion was found approaching the I-75 Interchange; the extent of the congestion varied, however the tail of the queue was typically found between I-75 and SR 400. This congestion was not found during the 1998 evening surveys.

(Between I-75 and US 29)

No congestion was found on this section of I-85 during the evening survey period in 1998 and 2001.

I-85 HOV

Morning:

(Between SR 316 and I-75)

In 2001, the HOV facility on I-85 was extended approximately 10 miles north, from the Perimeter to SR 316. Congestion was not found in either direction along the entire length of the HOV facility during the morning survey period; similarly, no congestion was found during the 1998 survey between I-75 and the Perimeter.

Evening:

(Between SR 316 and I-75)

During the evening surveys in 1998, congestion was not found in either direction in the HOV lanes on I-85. During the 2001 surveys, intermittent southbound congestion was found in the HOV lane approaching the I-75 Interchange; while the extent of the congestion varied from day to day, the tail of the queue was typically found between SR 400 and I-75.

SR 85

Morning:

(Between I-75 and Old National Highway; Clayton Co.)

During the 1998 and 2001 surveys, northbound congestion was found on SR 85 approaching the I-75 Interchange; the primary bottlenecks were at the signals at Garden Walk Blvd, Airport South Pkwy and Lee's Mill Rd. Queue populations typically ranged from approximately 20 to 40 vehicles per lane (two lanes).

Evening:

(Between I-75 and Old National Hwy; Clayton Co.)

During the 1998 and 2001 surveys, southbound congestion was found on SR 85 approaching the series of signals south of I-75; the primary bottleneck was found at the first signal at Forest Park Pkwy. During the 2001 survey, southbound congestion approaching the signal at Garden Walk Blvd intermittently extended back through the upstream signal at Airport South Parkway.

SR 92

Morning:

(Between I-75 and SR 400; Cherokee & Fulton Co.)

During the 1998 and 2001 surveys, similar congestion was found on SR 92 during the morning commuter period. Traveling eastbound from I-75, the first major queue was found approaching the signal at Wade Green Rd; during the peak period, queue populations sometimes exceeded 100 vehicles (one lane). Farther east, congestion was found at the series of signals approaching the SR 400 Interchange; the primary bottlenecks were found at Old Mountain Park Rd, Sandy Plains Rd and Bowen Rd. Extensive delays were apparent for eastbound travelers on this section of SR 92.

Evening:

(Between I-75 and SR 400; Cherokee & Fulton Co.)

During the 2001 survey, westbound congestion was typically found on SR 92 approaching the signal at Robin Rd (three miles west of I-575); during the peak period, congestion intermittently extended back through the upstream signal at Bells Ferry Rd. Queue populations typically ranged from 30 to 70 vehicles per lane. No level-of-service "F" conditions were found on SR 92 during the 1998 survey.

SR 120 (Dallas Rd)

Morning:

(Between SR 176 and Ridgeway Rd; Cobb Co.)

During the 2001 survey, eastbound congestion was typically found on SR 120 (Dallas Hwy) approaching the series of signals between Due West Rd and Ridgeway Rd; the signals that generated congestion included: Sandtown Rd, Hemswood Circle, Old Dallas Rd and Ridgeway Rd. This congestion was not found during the survey in 1998.

Evening:

(Between SR 176 and Ridgeway Rd; Cobb Co.)

No level-of-service "F" conditions were found on this section of the SR 120 corridor during the evening survey period.

SR 120 (Roswell Rd / Marietta Hwy)

Morning:

(Between Marietta Pkwy and SR 9/Atlanta St; Cobb Co.)

During the 1998 and 2001 surveys, westbound congestion was typically found on Roswell Rd approaching the Interchange at Marietta Pkwy; the primary bottlenecks were found at the series of signals between Piedmont Rd and Marietta Pkwy (Sewell Rd, Barnes Mill Rd, Robinson Rd and Greenbriar Pkwy). During the peak period, congestion often extended back through an upstream signal.

Evening:

(Between Marietta Pkwy and Atlanta St; Cobb County)

During the 2001 survey, eastbound congestion was found on SR 120 (Roswell Rd) approaching the signal at Robinson Rd; during the peak period, the queue intermittently extended back through the upstream signals at Marietta Pkwy. Similar congestion was found during the survey in 1998.

SR 120 Corridor (SR 120 / State Bridge Rd / Pleasant Hill Rd Corridor)

Morning:

(Between SR 92/140 and I-85; Fulton & Gwinnett Co.)

Traveling westbound from I-85, congestion was typically found approaching the signal at US 23/SR 13; queue populations ranged from approximately 20 to 40 vehicles per lane (two lanes). After clearing the signal, westbound travelers typically encountered the next signal queue at Peachtree Industrial Blvd; during the peak period, this queue length was approximately one-half mile long. These conditions were similar during the 1998 and 2001 surveys.

The next significant bottleneck found on State Bridge Rd was encountered at the signal at Jones Bridge Rd; during the peak period, the single lane queue often extended upstream for over one mile; this section of State Bridge Rd was under construction during the 1998 survey.

Farther west, approaching the SR 400 Interchange, extensive westbound congestion was found on SR 120 approaching the pair of signals at Brookside Pkwy, and the signal at North Point Pkwy; during the peak period, a mostly continuous queue extended from North Point Pkwy all the way back to the vicinity of State Bridge Rd (a distance of approximately 1.5 miles). This congestion was not found during the 1998 survey; however this may have been attributable to construction east of this location that created a bottleneck for westbound travelers.

Evening:

(Between SR 92/140 and I-85; Fulton & Gwinnett Co.)

Traveling eastbound from SR 92/140, the first major queue was found on SR 120 approaching the signals where the roadway divides at State Bridge Rd; congestion at this location typically extended back through several upstream signals. Continuing east, the next major queue was found at the signal at Jones Bridge Rd; during the peak period, extensive congestion sometimes extended upstream for over one mile. Construction was found along this corridor during the 1998 survey.

Farther east on Pleasant Hill Rd approaching the I-85 Interchange, two major signal queues were found at US Rte 23 and Steve Reynolds Blvd; during the peak period, large queue populations often extended back through upstream signals.

In the westbound direction, the signal at North Point Pkwy generated major congestion during the peak period; congestion often extended back through the upstream signal at Brookside Pkwy. Intermittent congestion was found at this location during the 1998 survey.

SR 140 (Holcomb Bridge Rd)

Morning:

(Between SR 400 and Peachtree Industrial Blvd; Gwinnett & Fulton Co.)

During the 1998 and 2001 surveys, severe southbound congestion was found on Holcomb Bridge Rd approaching and across the Chattahoochee River; the head of the queue was found at the first signal south of the river (Spalding Dr). During the peak period, the queue often extended back through the upstream signal at Barnwell Rd (a one to two mile queue length). This congestion appeared to develop earlier in the survey period in 1998 (6:30-7:30), whereas in 2001, congestion typically developed after 7:30 a.m.

In the northbound direction, congestion was found during both the 1998 and 2001 surveys approaching the SR 400 Interchange; however, in 2001, congestion was more severe. The primary bottlenecks were found at the signals at Old Alabama Rd and SR 400; during the peak period in 2001, congestion often extended back through four or five upstream signals for a distance of approximately two miles.

Evening:

(Between SR 141 and SR 400; Gwinnett & Fulton Co.)

Traveling northbound from SR 141, the first primary bottleneck was found at the signal at Spalding Dr; congestion found here during the 2001 survey was more extensive than congestion found in 1998. During the peak period, queue populations in 2001 ranged from 30 to 100 vehicles per lane (two lanes).

Farther north, congestion was found approaching and across the Chattahoochee River; the primary bottleneck was found at the first signal north of the river (Barnwell Rd). While the extent of the queue was similar in 1998 and 2001 (one to two miles), congestion found in 2001 generally persisted later in the survey period.

SR 141 (Peachtree Industrial Blvd & Pkwy / Medlock Bridge Rd)

Morning:

(Between McGinnes Ferry Rd and the Perimeter; Fulton, Gwinnett & Dekalb Co.)

Similar congestion was found on SR 141 during the surveys in 1998 and 2001. During the morning survey period, southbound travelers incurred extensive delays approaching and across the Chattahoochee River. North of the river, the primary bottlenecks were found at signals at State Bridge Rd and Old Alabama Rd; during the peak period, congestion at Old Alabama Rd typically extended back through the signal at State Bridge Rd, for a total queue length of approximately 1.5 miles.

South of the river, the primary bottlenecks were found at the signals at Medlock Bridge Rd and Peachtree Corners Circle; during the peak period, a mostly continuous queue extended back to the vicinity of the Chattahoochee River (a distance of approximately 1.5 miles).

On the freeway section of SR 141, southbound congestion was found during the peak period approaching the Perimeter Interchange; the tail of this queue was typically found in the vicinity of Jones Mill Rd (a distance of three miles). Average speeds typically ranged from 25 to 45 mph along this congested zone.

Evening:

(Between McGinnes Ferry Rd and the Perimeter; Fulton, Gwinnett & Dekalb Co.)

During the 2001 survey, northbound congestion was consistently found at the end of the freeway section of SR 141 approaching the first signalized intersection (Holcomb Bridge Rd) on Peachtree Industrial Blvd; during the peak period, congestion extended back to the vicinity of the Interchange at Jones Mill Rd (a distance of one mile). While congestion was found approaching this signal during the 1998 survey, the queue was not as extensive. During both the 1998 and 2001 surveys, northbound travelers on Peachtree Pkwy typically encountered signal queues approaching the Chattahoochee River; the primary bottlenecks were found at Holcomb Bridge Rd, Spalding Dr and Jones Bridge Rd. Continuing northbound across the Chattahoochee River,

severe congestion was typically found during the peak period approaching the signal at Old Alabama Rd; a one to two mile queue typically extended back across the Chattahoochee River (1998 and 2001 survey).

SR 166 (Campbellton Rd / Lakewood Freeway)

Morning:

(Between Camp Creek Pkwy and I-75; Fulton Co.)

No level-of-service "F" conditions were found on SR 166 during the morning survey period.

Evening:

(Between Camp Creek Pkwy and I-75; Fulton Co.)

No level-of-service "F" conditions were found on SR 166 during the evening survey period.

SR 176 / 6 Corridor

Morning:

(Between SR 120 and I-85; Cobb, Douglas & Fulton Co.)

During the 1998 and 2001 surveys, southbound congestion was found on SR 6 approaching the signal at US 78 (Bankhead Highway); queue populations ranged widely, from 20 to 70 vehicles per lane (two lanes). Farther south, southbound travelers typically encountered extensive congestion approaching and across the Chattahoochee River; the head of this queue was found at the signal at Fulton Industrial Blvd. Congestion appeared to be exacerbated by queued vehicles in the left-turn bay; this queue typically extended back into the mainline.

Evening:

(Between SR 120 and I-85; Cobb, Douglas & Fulton Co.)

During the 2001 survey, northbound congestion was found on SR 6 (Thornton Rd) between I-20 and US 78 (Bankhead Hwy); the primary bottlenecks were found at the signals at the I-20 Interchange, Skyview Dr, Maxham Rd and US 78. Queue populations at these signals typically ranged from 20 to 40 vehicles per lane; during the peak period, northbound travelers appeared to experience significant delay along this section of SR 6. Congestion was also found at this location in 1998; however, congestion was intermittent.

I-285 - Perimeter

Morning:

(Between I-75 and I-20; west)

During the 1998 survey, an extended zone of northbound congestion was typically found on the Perimeter between the Chattahoochee River and I-75; this congestion was affected by ongoing construction zone at the I-75 Interchange. During the 2001 survey, northbound congestion was found on the Perimeter between the Chattahoochee River and Paces Ferry Rd; this congestion appeared to be caused or exacerbated by ongoing construction zone at Paces Ferry Rd Interchange. Average estimated speeds through this congested zone typically ranged from 30 to 50 mph.

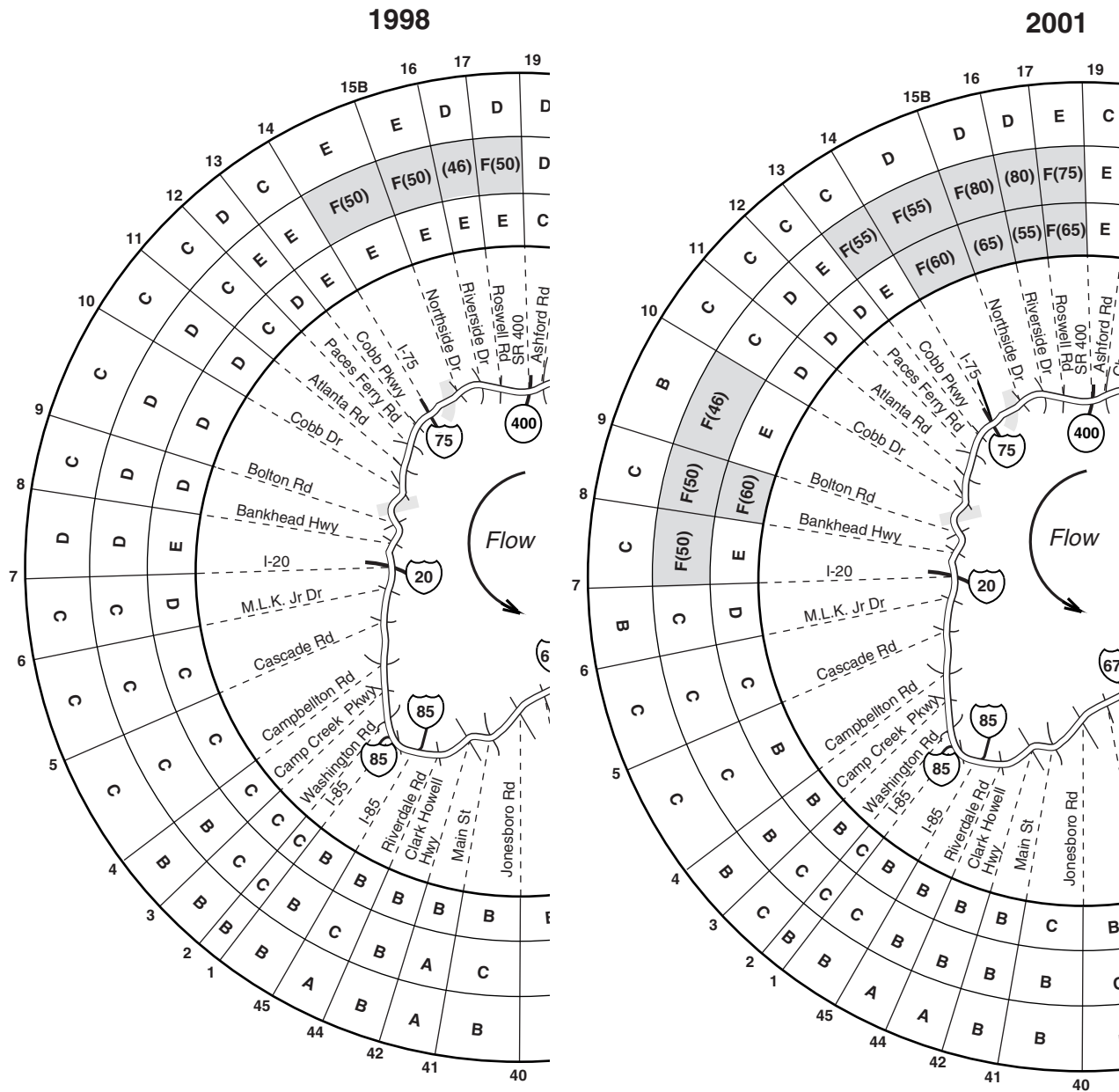
(Between I-75 and I-85; north)

During the 1998 surveys, westbound congestion was found on the Perimeter between the Interchanges at I-85 and Ashford Dunwoody Rd; the head of this queue was found on the exit ramp at Ashford Dunwoody Rd, where traffic typically backed into the mainline of the Perimeter. During the 2001 surveys, the exit queue at Ashford Dunwoody did not affect Perimeter traffic; while congestion along this section of the Perimeter was still consistently found, average densities were slightly lower than those recorded in 1998. However, west of Ashford Dunwoody, congestion was found in the right lanes of the Perimeter approaching the SR 400 Interchange; intermittent stop-and-go conditions were found in these lanes. This congestion was not found during the 1998 survey.

In the eastbound direction, similar congestion was found during the 1998 and 2001 surveys approaching the lane drop (6 lanes to 5) at Northside Dr; congestion typically extended back

**Perimeter (I-285)
Counter Clockwise Flow
Evening (Fall 1998 vs Fall 2001)**

Time Rings
Outer - 6:00 - 7:00 p.m.
Middle - 5:00 - 6:00 p.m.
Inner - 4:00 - 5:00 p.m.



(Between SR 400 and I-75; north)

During the 1998 and 2001 surveys, an extended zone of westbound congestion was found on the Perimeter between SR 400 and I-75; the head of the queue was found in the exit lanes approaching the I-75 Interchange. The severity and duration of congestion recorded in 2001 was greater than that found during the 1998 survey.

(Between I-75 and I-20; west)

During the 1998 survey, a short zone of southbound congestion was found on the Perimeter approaching the I-20 Interchange; congestion was typically found in the right lanes where vehicles exited to I-20 westbound. While the cause of congestion at this location was the same during the 2001 survey, southbound congestion often extended back across all lanes to the vicinity of the Chattahoochee River (a distance of approximately three miles).

across the Chattahoochee River to the I-75 Interchange. Average speeds approaching and across the river typically ranged from 30 to 40 mph.

(Between I-85 and I-20; east)

During the 1998 and 2001 surveys, severe northbound congestion was found on the Perimeter between the vicinity of US 278 (Covington Hwy) and Lavista Rd; average estimated speeds along this seven-mile zone of congestion typically ranged from 20 to 40 mph.

Evening:

(Between I-75 and I-20; west)

During the 1998 survey, a short zone of southbound congestion was found on the Perimeter approaching the I-20 Interchange; congestion was typically found in the right lanes where vehicles exited to I-20 westbound. While the cause of congestion at this location was the same during the 2001 survey, southbound congestion often extended back across all lanes to the vicinity of the Chattahoochee River (a distance of approximately three miles).

(Between I-75 and SR 400; north)

During the 1998 and 2001 surveys, an extended zone of westbound congestion was found on the Perimeter between SR 400 and I-75; the head of the queue was found in the exit lanes approaching the I-75 Interchange. The severity and duration of congestion recorded in 2001 was greater than that found during the 1998 survey.

(Between SR 400 and US 78; north/east)

During the 1998 and 2001 surveys, an extended zone of eastbound/southbound congestion was found on the Perimeter between SR 400 and US 78 (Stone Mountain Freeway); the two primary bottlenecks were found at the I-85 Interchange and the lane drop (5 lanes to 4) at Lawrenceville Rd. During the peak period, average estimated speeds along this twelve-mile corridor typically ranged from 15 to 30 mph.

SR 316

Morning:

(Between I-85 and SR 20; Gwinnett Co.)

During the 2001 survey, extensive westbound congestion was found on SR 316 approaching the pair of signals at SR 20 and Collins Hill Rd; queue populations at the signals ranged widely, from approximately 30 to 60 vehicles per lane (two lanes). During the 1998 survey, only minor intermittent congestion was found at these signals.

Evening:

(Between I-85 and SR 20; Gwinnett Co.)

During the 2001 survey, eastbound congestion was consistently found at the end of the freeway section of SR 316 approaching the signal at Collins Hill Rd; during the peak period, congestion extended back to the vicinity of the Interchange at SR 120 (a distance of 1.5 miles). After clearing this signal, eastbound travelers typically encountered the next signal queue at SR 20; this queue typically contained 20 to 40 vehicles per lane (two lanes). In the westbound direction, congestion on SR 316 was found approaching the signal at SR 20; queue populations ranged widely, from 20 to 75 vehicles per lane (two lanes). While congestion was found at these signals in 1998, congestion was intermittent and less severe.

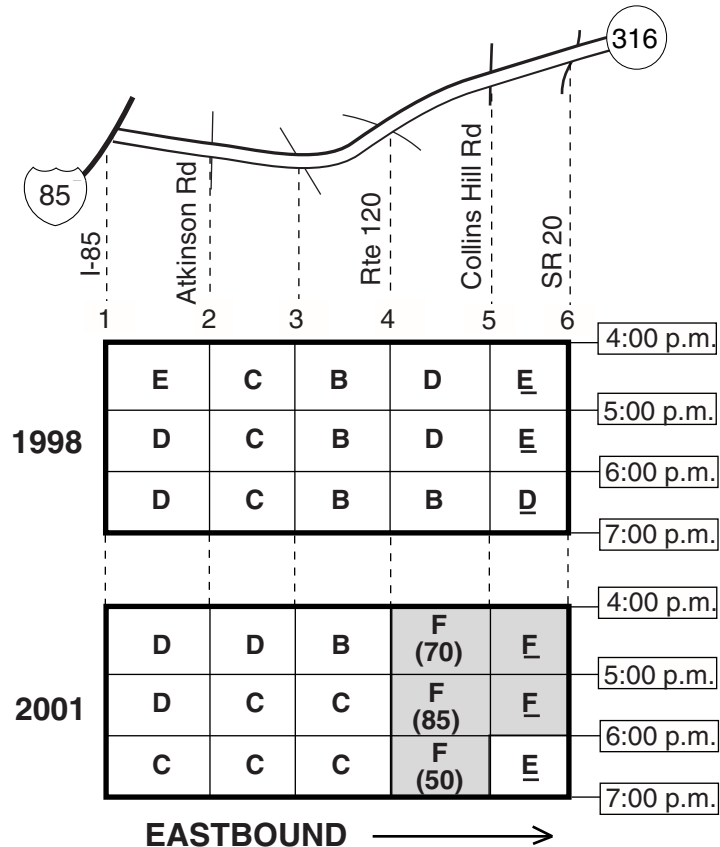
SR 400

Morning:

(Between Cumming St and I-85)

During the 1998 and 2001 morning surveys, an extended zone of southbound congestion was found on SR 400 between the vicinity of Windward Parkway and Abernathy Rd; average speeds through this ten to twelve mile queue ranged widely, from 10 to 45 mph. While the extent of the congestion was similar in 1998 and 2001, the duration and severity recorded in 2001 increased.

SR 316 (Gwinnett County) EVENING (Fall 1998 vs. Fall 2001)



During the 2001 survey, eastbound congestion was consistently found at the end of the freeway section of SR 316 approaching the signal at Collins Hill Rd; during the peak period, congestion extended back to the vicinity of the Interchange at SR 120 (a distance of 1.5 miles). After clearing this signal, eastbound travelers typically encountered the next signal queue at SR 20; this queue typically contained 20 to 40 vehicles per lane (two lanes). In the westbound direction, congestion on SR 316 was found approaching the signal at SR 20; queue populations ranged widely, from 20 to 75 vehicles per lane (two lanes). While congestion was found at these signals in 1998, congestion was intermittent and less severe.

LEVEL-OF-SERVICE LEGEND:

LIGHT	MODERATE		HEAVY	CONGESTED		SEVERE
A	B	C	D	E	F	F
0	10	20	30	45	65	
Density scale (cars per lane-mile)						
Note: F (60) in the tables means level-of-service "F", with density = 60						

SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>

Evening:

(Between Cumming St and I-85)

During the 1998 and 2001 evening surveys, a short zone of severe northbound congestion was found approaching the Perimeter Interchange. North of the Perimeter, congestion persisted for approximately five miles to the vicinity of Northridge Rd; however, average speeds improved along this section of SR 400 (40-50 mph).

During the 1998 survey, a short zone of northbound congestion was found on SR 400 approaching the lane drop (3 lanes to 2) in the vicinity of Haynes Bridge Rd. During the peak period in 2001, a six to seven mile zone of congestion was typically found approaching the lane drop; average speeds ranged widely, from 20 to 45 mph.

During the 2001 evening surveys, short zones of southbound congestion were found on SR 400 approaching the Perimeter Interchange, and again farther south at the terminus at I-85; this congestion was not found during the 1998 survey.

I-575**Morning:**

(Between SR 92 and I-75)

During the peak period in 1998, a one to two mile zone of southbound congestion was typically found on I-575 approaching the I-75 Interchange; the tail of the queue was typically found between the Interchanges at Barrett Parkway and Chastain Rd. In 2001, a three to four mile zone of congestion was typically found at this location, with the tail of the queue in the vicinity of the Bells Ferry Rd Interchange. Average estimated speeds along this corridor typically ranged from 25 to 45 mph.

Evening:

(Between SR 92 and I-75)

During the evening surveys in 1998 and 2001, a similar one to two mile zone of northbound congestion was found between I-75 and the first Interchange to the north (Barrett Pkwy); average estimated speeds typically ranged from 35 to 45 mph.

I-675**Morning and Evening:**

(Between the Perimeter and I-75)

No congestion was found on I-675 during the morning or evening survey periods in 1998 and 2001.

I-985**Morning and Evening:**

(Between SR 20 and I-85)

No congestion was found on I-985 during the morning or evening survey periods in 1998 and 2001.

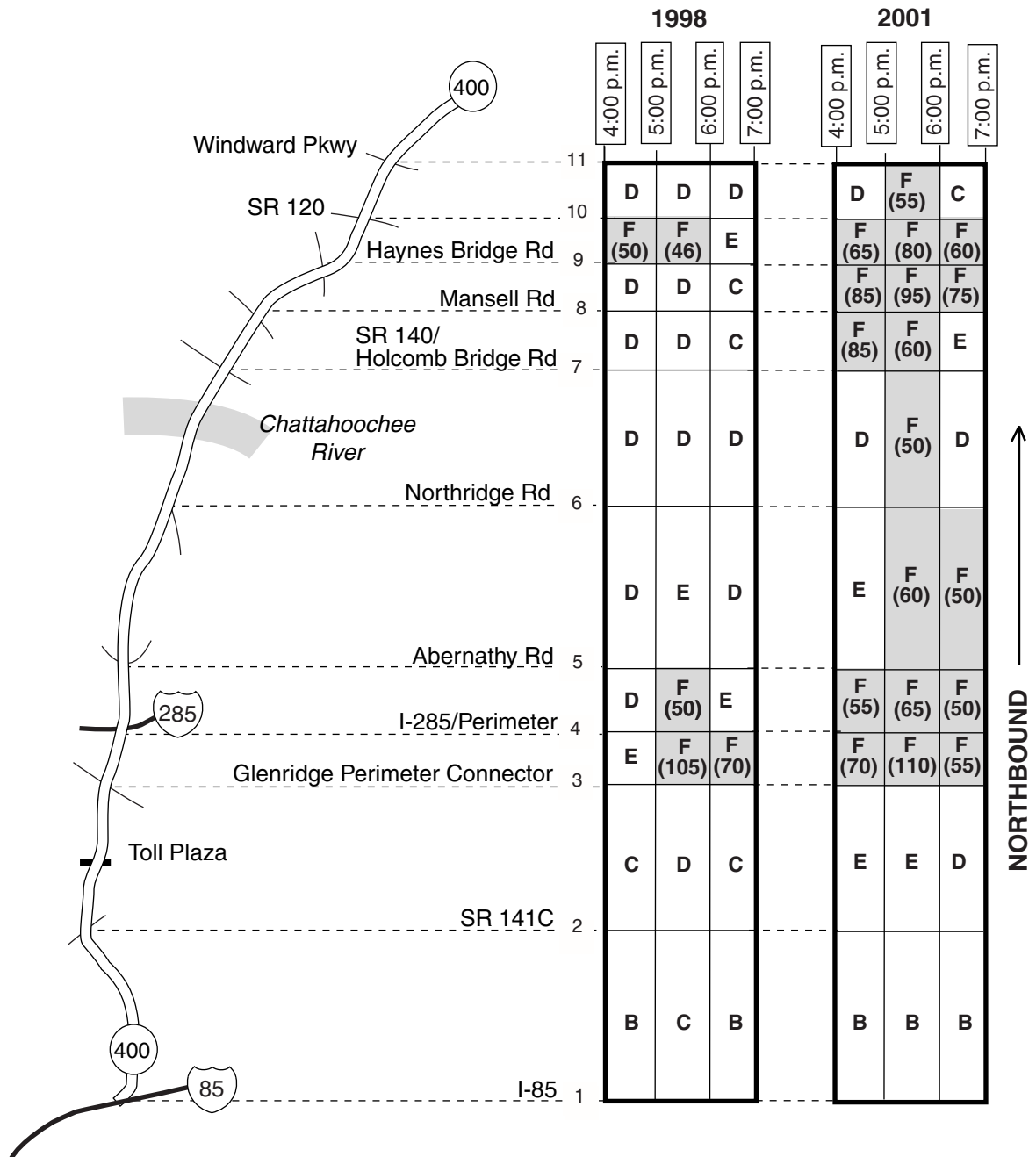
Barrett Pkwy / Ridgeway Rd**Morning:**

(Between SR 120 and I-575; Cobb Co.)

During the 1998 and 2001 surveys, extended northbound delays were typically found at the signal at Burnt Hickory Rd; queue populations during the peak period often ranged from 40 to 80 vehicles per lane (two lanes). At its maximum observed extent, the signal queue extended upstream for approximately one mile.

After clearing the signal at Burnt Hickory Rd, northbound travelers typically encountered congestion again at Stilesboro Rd, Old Hwy 41 and Cobb Pkwy (US 41). Queue populations at these signals ranged widely, from approximately 20 to 50 vehicles per lane (two lanes).

SR 400 Evening (Fall 1998 vs. Fall 2001)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED	SEVERE
A	B	C	D	E	F	F	F
0	10	20	30	45	65		
Density scale (cars per lane-mile)							
Note: F (60) in the tables means level-of-service "F", with density = 60							

During the 1998 survey, a short zone of northbound congestion was found on SR 400 approaching the lane drop (3 lanes to 2) in the vicinity of Haynes Bridge Rd. During the peak period in 2001, a six to seven mile zone of congestion was typically found approaching the lane drop; average speeds ranged widely, from 20 to 45 mph.

Evening:

(Between I-575 and SR 120; Cobb Co.)

During the 2001 survey, southbound congestion was typically found on Ridgeway Rd approaching the pair of signals at Old Hwy 41 and Stilesboro Rd; queue populations at these signals ranged widely, from 20 to 80 vehicles per lane (two lanes). No level-of-service "F" conditions were found on Barrett Pkwy/Ridgeway Rd during the 1998 survey.

Marietta Parkway

Morning:

(Between the I-75 Interchanges; Cobb County)

While no level-of-service "F" conditions were found on the thru-lanes of Marietta Parkway during the morning survey period, extensive southbound congestion was found in the left lanes of S. Marietta Pkwy approaching the I-75 Interchange. During the peak period, the queue typically extended back through several upstream signals. Congestion was also found at this location in 1998; however, congestion was not as severe.

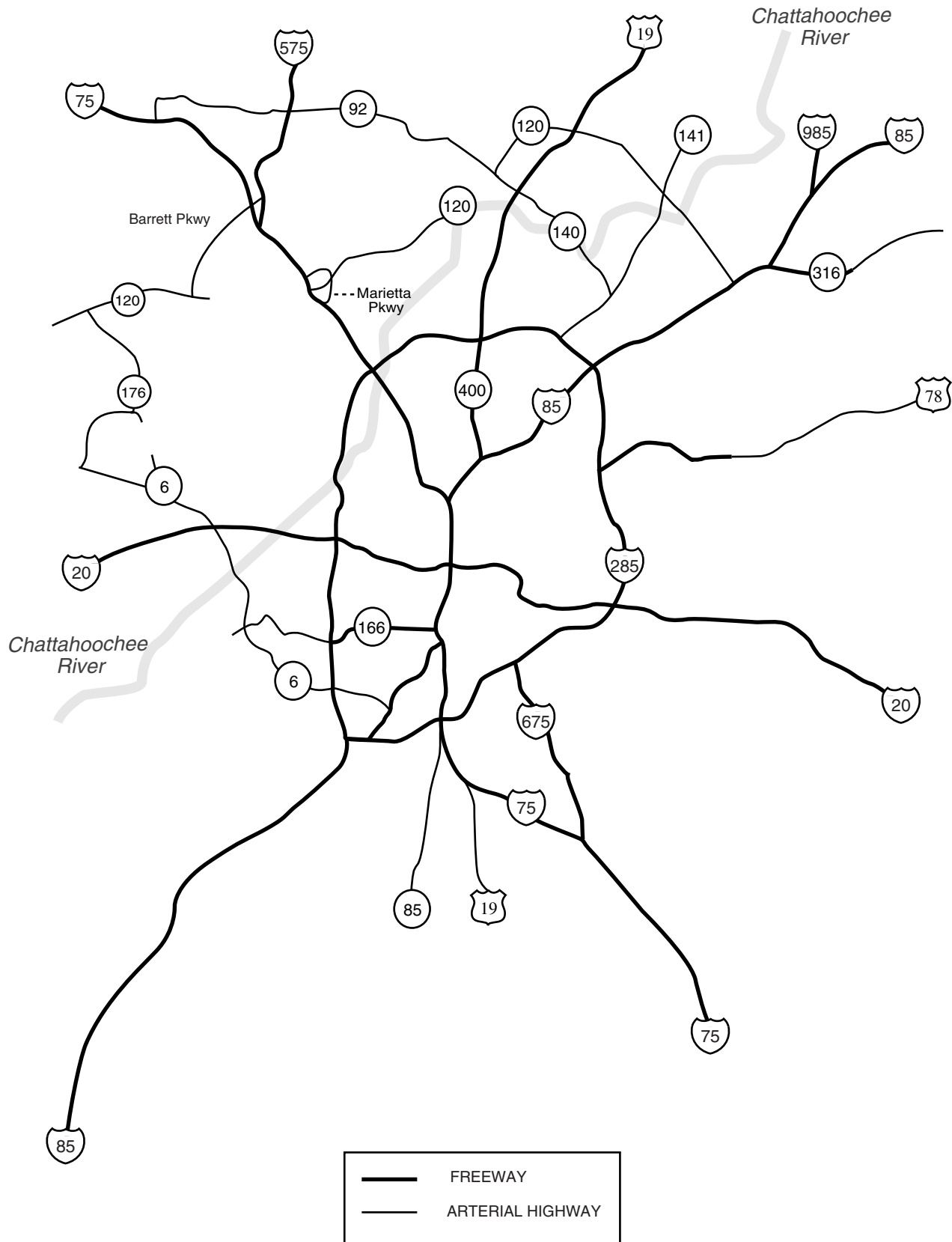
Evening:

(Between the I-75 Interchanges; Cobb Co.)

While no level-of-service "F" conditions were found on the thru-lanes of Marietta Parkway during the evening survey period, extensive congestion was found exiting at Robinson Rd (northbound). This congestion was found during both the 1998 and 2001 surveys.

SURVEYED HIGHWAYS

Fall 2001



INTRODUCTION

In the fall of 2001, Skycomp conducted a series of aerial photo-surveys of highway traffic conditions in the planning region of the Atlanta metropolitan area. The purpose was to update information on traffic conditions and obtain other materials to support regional planning activities. By repeating survey coverage on a three to five year cycle, long-term trends can be monitored, while the effects of changes on the system can be evaluated. Using the mobility and vantage point of fixed-wing aircraft, a photographic inventory of traffic conditions was made on the backbone of the transportation system; approximately 500 miles of highways were surveyed during the peak morning and evening periods of commuter travel (see opposite page). One of the products of this survey program is a database of traffic conditions on each link of the freeway system, representing average conditions as of fall 2001.

In the fall of 1998, a similar survey of the Atlanta regional freeway system was conducted. The 2001 survey was conducted using the same methodology.

FEATURES OF THE AERIAL SURVEY PROGRAM

During this aerial survey program, overlapping photographic coverage was obtained of designated freeways, repeated once an hour over four morning and four evening commuter periods. The morning times of coverage were 6:30-9:30 a.m., and evening times were 4:00-7:00 p.m. Survey flights were conducted only on weekdays, except that Monday mornings, Friday evenings and mornings after holidays were excluded. Data were extracted from the aerial photographs such that, by link and by time slice, average recurring daily traffic conditions could be measured. This report presents these measurements in the following ways:

1. Performance rating tables of traffic conditions on the 500 miles of surveyed highways are presented in **Part One** (morning) and **Part Two** (evening) of this report, *on the right-hand side pages*. The ratings are presented in tables by highway segment, by direction and by time slice. Each rating represents the average of approximately four flyovers (from four different days), minus any data affected by incidents. For uninterrupted-flow facilities, the ratings are density-based level-of-service (LOS) designations "A", "B", "C", "D", "E" and "F", as defined in the 2000 *Highway Capacity Manual* (HCM). For interrupted-flow facilities, a surrogate level-of-service measure has been used. Developed by Skycomp for use with overlapping aerial photographs, this surrogate measure is based on platoon sizes and queuing characteristics at signalized intersections -- not travel times, which is the defining parameter for arterial LOS in the 2000 HCM. Because this is a surrogate LOS measure, the same letters "A" through "F" have been used; however, these ratings have been underlined to identify them as *surrogate* LOS measures ("A", "B", "C", etc.). NOTE: The procedures for arriving at the performance ratings have been outlined in **Appendix A**.

2. Also in **Part One** and **Part Two** of this report, highway maps containing narratives have been placed opposite each performance-rating table, *on the left-hand side*. These narratives clarify the severity and frequency of all congestion found along each highway segment. Where evident, apparent causes of the problems are also described. Congestion on crossing freeways and on interchange ramps are also depicted and discussed.

3. In order to allow the estimation of vehicle speeds from densities on the freeways, Skycomp has built a database from data collected in Atlanta (in 1998) and other cities demonstrating the precise relationship between traffic densities and speeds. From this database, a look-up table was developed relating the two variables. The result of Skycomp's work in is provided in **Appendix B**.

4. The dates of all survey flights are presented in **Appendix C**. The flight numbers are also provided; these are needed in order to fully interpret the density tables provided in Appendix D (provided separately).

5. Tables showing all individual vehicle density calculations before averaging are provided separately in Appendix D. This appendix contains morning and evening tables with the results of different flights shown side-by-side, by time slice. Data that were identified for exclusion (due to confirmed or presumed incidents) are also tagged accordingly. This appendix allows a user to investigate density calculations (flight by flight), which underlie each averaged performance rating. *NOTE: All data values in these tables are truncated density values, in units of 10; for example, a density value of 26 passenger cars per lane-mile is represented by a "2", etc.*

6. A primary deliverable for this project is an electronic version of the Survey Database (built in Microsoft Access). This database will be functional and contain all of the collected data, from vehicle counts and road segmentation, to flight information and the variables used to calculate densities. Using this database, a number of reports can be displayed or printed, including segment densities (averaged or by individual observation), vehicle classification, and incident information. Since all data is saved in a relational database, it is possible to customize an unlimited number of queries and reports.

7. Two interactive CD-ROM products have been prepared in conjunction with the fall 2001 survey program. The first is the **Congestion Highlights** slide show; this product presents the findings of this report, plus many highlight aerial photographs of congestion. This product can be projected to audiences "as is"; the interactive feature allows a presenter to respond to audience interests by going to specific locations as they come up in the discussion. Perhaps more useful is the fact that any graphic or photo in the slide can be "captured" using the "Print-screen" key on the keyboard, and then pasted into custom PowerPoint slide shows for projection, or into word-processed documents for printing or emailing.

The second slide show, the **Peak-Traffic Photolog**, contains overlapping photographic coverage of the entire 500-mile system -- twice. Using actual survey photographs, typical peak-hour passes were selected during both morning and evening survey periods. These passes represent a snapshot of how the highway system looked on a typical day (as much as possible, passes were selected that did not include the effects of major incidents). However, it must be remembered that congestion is an ever-changing phenomenon: some locations are intermittently congested every day, or sometimes throughout one morning but not the next. Also, a location may typically be congested only for a short period of time every day, say only before 7:00 a.m. Thus, when viewing this slide show, keep in mind that the presence or absence of congestion at any specific point does not mean that it's always this way. Because survey findings are based on four mornings and four evenings, the actual report or **Congestion Highlights** slide show must be referenced to get full survey results.

Nevertheless, most problem areas will be well-represented in these photographs; like the other slide show, the **Peak-Traffic Photolog** can be used both interactively in front of an audience, or used as a source of individual photographs for PowerPoint slide shows or printed documents.

ACKNOWLEDGMENTS AND DISCLAIMER

Survey operations would not have been possible without the assistance of regional FAA air traffic controllers. Aircraft were furnished by or contracted through the Elite Flight Center in Atlanta, GA.

In order to predict average travel speeds from traffic densities, a staff member of the Metropolitan Washington, D.C. Council of Governments (Paul DeVivo) calibrated a single-regime model developed by Michel Van Aerde for use in the metropolitan Washington area. The model was submitted by Van Aerde to the Transportation Research Board in 1995 (TRB Paper No. 95082; see also discussion in Appendix B).

The contents in this publication reflect the views of the author(s), who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Georgia Department of Transportation or the Federal Highway Administration. This publication does not constitute a standard, specification or regulation.

QUESTIONS

If there are any questions about this survey program or the underlying methodology, please direct them to Ken Stanek at 410-884-6900.

FREEWAY LEVEL -OF-SERVICE RATINGS (UNINTERRUPTED-FLOW FACILITIES):

(NOTE: LEVEL-OF-SERVICE RATINGS ARE BASED ON AVERAGE DENSITIES BETWEEN INTERCHANGES, WHICH ARE GENERALLY GREATER THAN ONE MILE APART. THE EFFECTS OF INCIDENTS AND TEMPORARY ROADWORK HAVE BEEN REMOVED FROM ALL RATINGS BEFORE AVERAGING.)

Level-of-service A: Light traffic flow, at free-flow speeds.

Level-of-service B: Light-to-moderate traffic flow, at free-flow speeds.

Level-of-service C: Moderate traffic flow, usually at free-flow speeds; freedom to maneuver somewhat restricted.

Level-of-service D: Moderate to heavy traffic flow; speeds can be slightly below free-flow; freedom to maneuver significantly restricted.

Level-of-service E: Heavy traffic flow, at speeds typically between 60 and 40 mph. Little or no capacity to absorb additional traffic.

Level-of-service F: Congested traffic flow, with speeds that can range from below 5 mph almost up to 60 mph. For this reason, all "F" ratings have been augmented with average density values, which provide greater insight into the nature of the traffic flow (units are passenger cars per lane-mile):

Densities from 46 to 60: "level-of-service "F" traffic flow averaging approximately 50-30 mph;

Densities from 60 to 80: "slow-then-go" traffic flow (some stopping can occur); traffic flow averaging approximately 40-15 mph;

Densities from 80 to 100: typically associated with "stop-and-go" traffic flow; average travel speeds approximately 25-10 mph. This is the upper boundary that daily congestion is normally measured at.

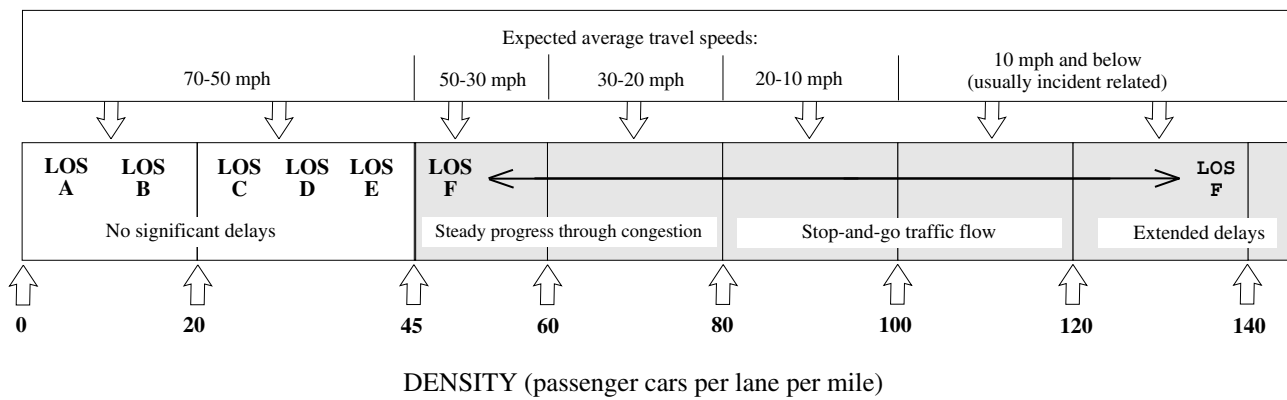
(Densities above 100 for the full length of a segment usually indicate the presence of an incident or construction.)

Densities from 100 to 120: Average travel speeds typically between 15 and 5 mph. In rare cases, daily congestion can be measured at this level, especially for short bottleneck segments.

Densities from 120 to 180: severe congestion associated with incidents or construction (180 is the highest density measured by Skycomp, with a corresponding average travel speed below 5 mph).

(For more information, refer to "Procedures for determining freeway level-of-service" in the Appendix A. These service level definitions are based on the 2000 Highway Capacity Manual.)

SUMMARY OF FREEWAY TRAFFIC QUALITY RATINGS (DENSITY-BASED LEVEL-OF-SERVICE)



These service level definitions are based on the 2000 Highway Capacity Manual

ARTERIAL HIGHWAY TRAFFIC QUALITY RATINGS (INTERRUPTED-FLOW FACILITIES)*:

(NOTE: THESE DESCRIPTIONS APPLY TO TRAVEL ALONG HIGHWAY SEGMENTS, WHICH ARE GENERALLY GREATER THAN ONE MILE IN LENGTH; CONGESTED INTERSECTIONS WITHIN EACH SEGMENT ARE REPORTED SEPARATELY. THE EFFECTS OF INCIDENTS AND TEMPORARY ROADWORK HAVE BEEN REMOVED FROM ALL RATINGS BEFORE AVERAGING.)

Arterial quality level A: Very light traffic flow; few cars using the roadway.

Arterial quality level B: Light traffic flow; little or no platooning.

Arterial quality level C: Moderate traffic flow; platoon populations under 15 vehicles per lane.

Arterial quality level D: Heavy traffic flow; queuing at signals, but all should clear on green (less than 20 vehicles per lane); platoon populations between 15 and 25 vehicles per lane.

Arterial quality level E: Congested traffic flow; large queues (20-40 vehicles per lane) at one or two intersections; slow-moving platoons of greater than 25 vehicles per lane (if one lane, resembles a funeral procession). Also may designate intermittent "E" congestion.

Arterial quality level F: Severely congested traffic flow, usually exhibiting either: 1) traffic backing through upstream signal(s); 2) a series of intersections with large queues (20-40 vehicles per lane); or 3) greater than 40 vehicles per lane queued at one intersection.

* (While these are not arterial level-of-service ratings, they are consistent with the qualitative descriptions of each service level as described on page 11-4 of the 2000 Highway Capacity Manual. They do not represent travel time measurements, however, which are the basis for calculating arterial service level ratings.)

(For more information, refer to "Procedures for determining arterial highway traffic conditions" in the Appendix A.)

SUMMARY OF ARTERIAL HIGHWAY TRAFFIC CONDITION RATINGS (SURROGATE LEVEL-OF-SERVICE)

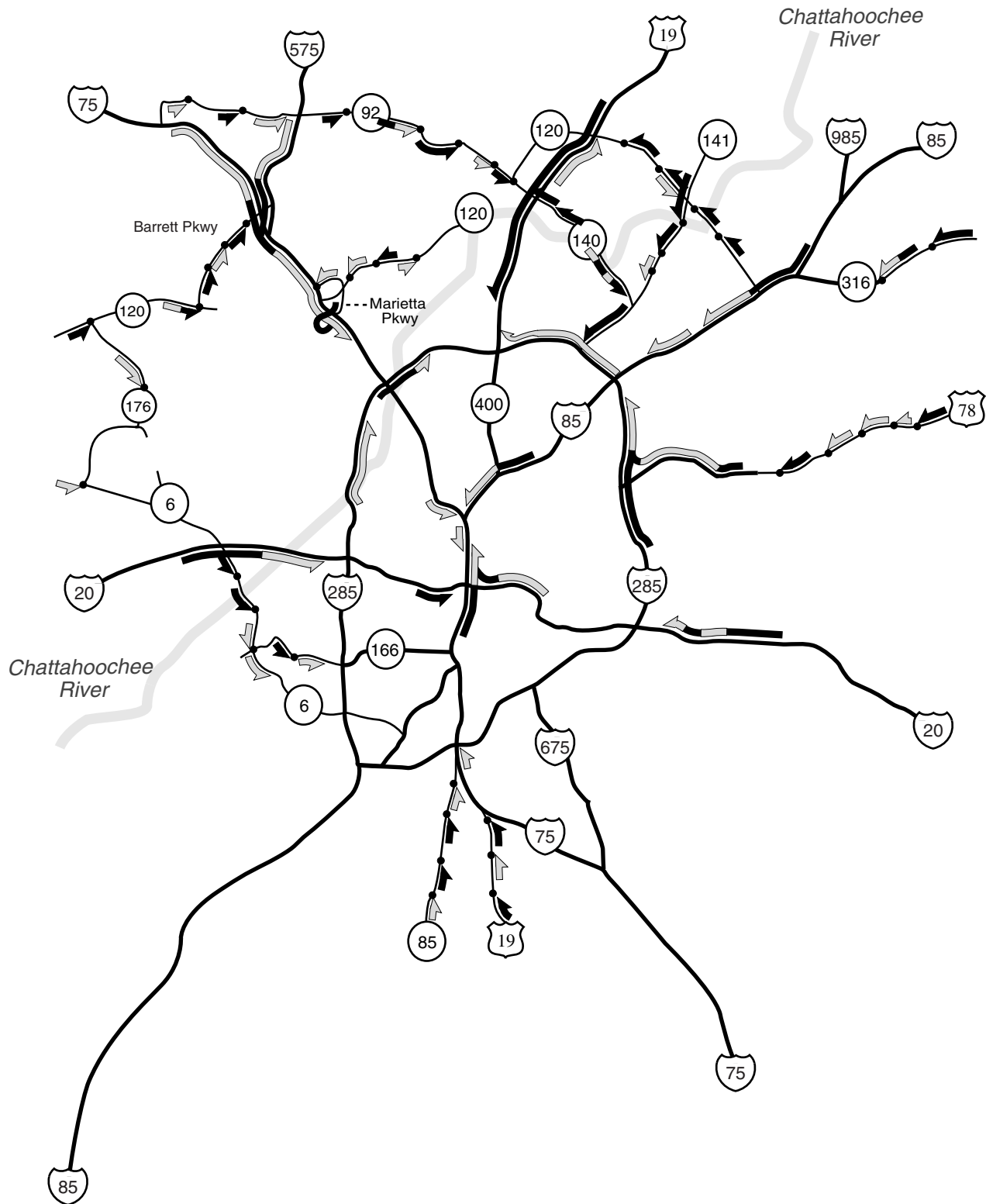
Performance ratings on interrupted-flow segments which are generally 1 to 3 miles in length:					
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
Very light traffic; few cars on road.	Light traffic; little or no platooning.	Moderate traffic; platoons less than 15 veh. per lane.	Heavy traffic; platoons between 15 and 25 veh. per lane.	Congested traffic; platoons more than 25 veh. per lane; large queues at 1 or 2 intersections.	Severely congested traffic; queuing thru upstream signal(s); series of congested intersections.

(Surrogate level-of-service ratings (underlined) are not travel-time based; however, qualitative descriptions of traffic flow at each service level in Chapter 11 of the 2000 Highway Capacity Manual were used in development of this rating system.)



*Rating system developed by SKYCOMP, Inc. Columbia MD,
for use with overlapping aerial photographs of highway segments.*

LOCATIONS WHERE CONGESTION WAS FOUND




Morning - Fall 2001



FREEWAY TRAFFIC QUALITY

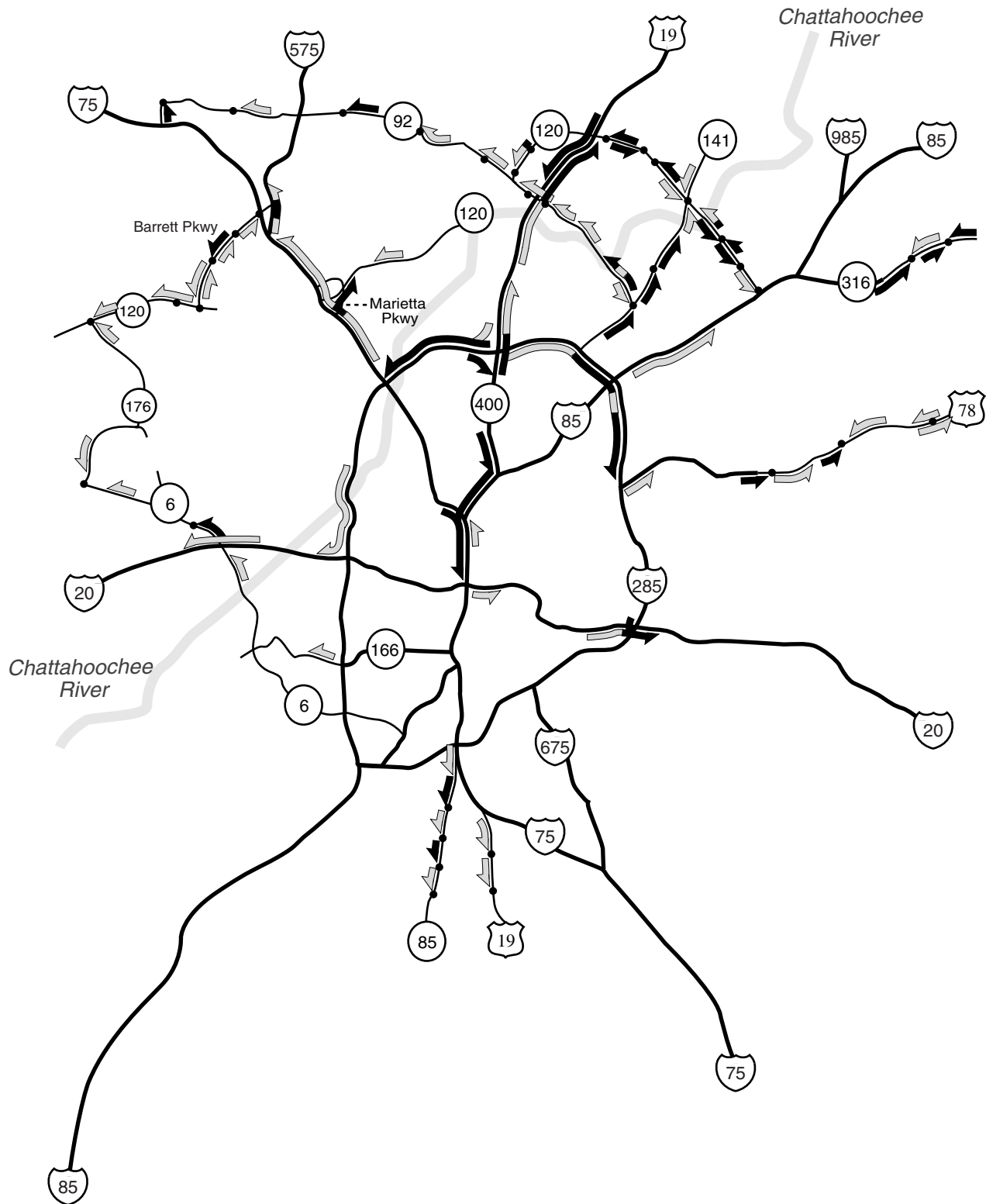
-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

SIGNALIZED HIGHWAY TRAFFIC QUALITY



-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

LOCATIONS WHERE CONGESTION WAS FOUND




Evening - Fall 2001



FREEWAY TRAFFIC QUALITY

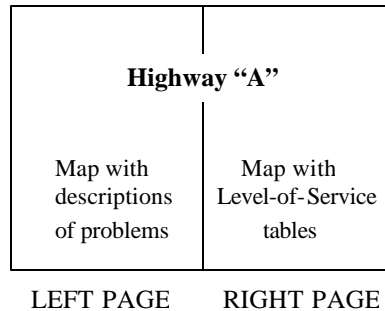
-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

PART ONE

MORNING SURVEY PERIOD



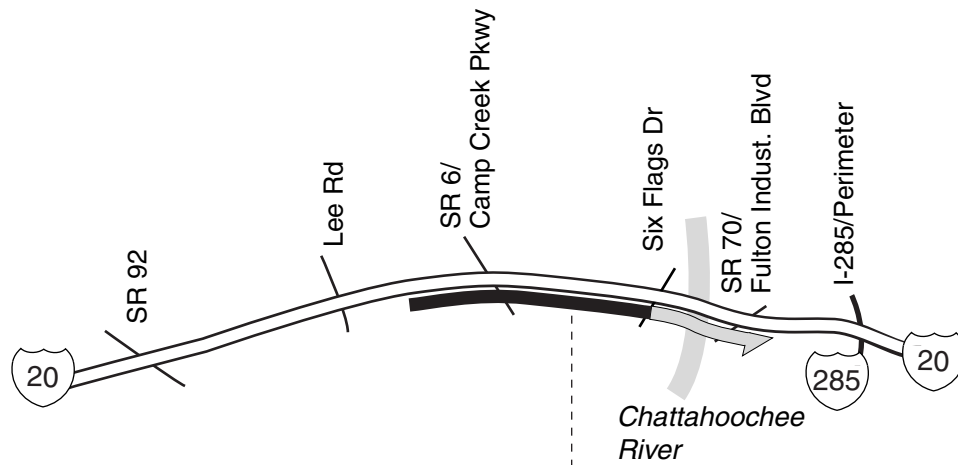
Each highway is presented in a set of opposing maps. The maps with the technical tables on the right contain averaged level-of-service ratings, minus the effects of any known or suspected incidents (actual density values are provided for all LOS “F” ratings). Details are presented in narratives on the left.

Highways are presented in the following order:

- I-20
- US 41 / 19 – Tara Blvd
- I-75
- US 78 – Stone Mountain Fwy
- I-85
- SR 85
- SR 92
- SR 120 – Dallas Hwy
- SR 120 – Roswell Rd
- SR 120 – State Bridge Rd / Pleasant Hill Rd
- SR 140 – Holcomb Bridge Rd
- SR 141 – Peachtree Industrial Blvd / Peachtree Pkwy / Medlock Bridge Rd
- SR 166 – Campbellton / Lakewood Fwy
- SR 176 / SR 6 / Camp Creek Pkwy
- I-285 - Perimeter
- SR 316
- SR 400
- I-575
- I-675
- I-985
- Barrett Pkwy / Ridgeway Rd
- Marietta Pkwy





I-20 (Between SR 92 & I -285) MORNING (FALL 2001)

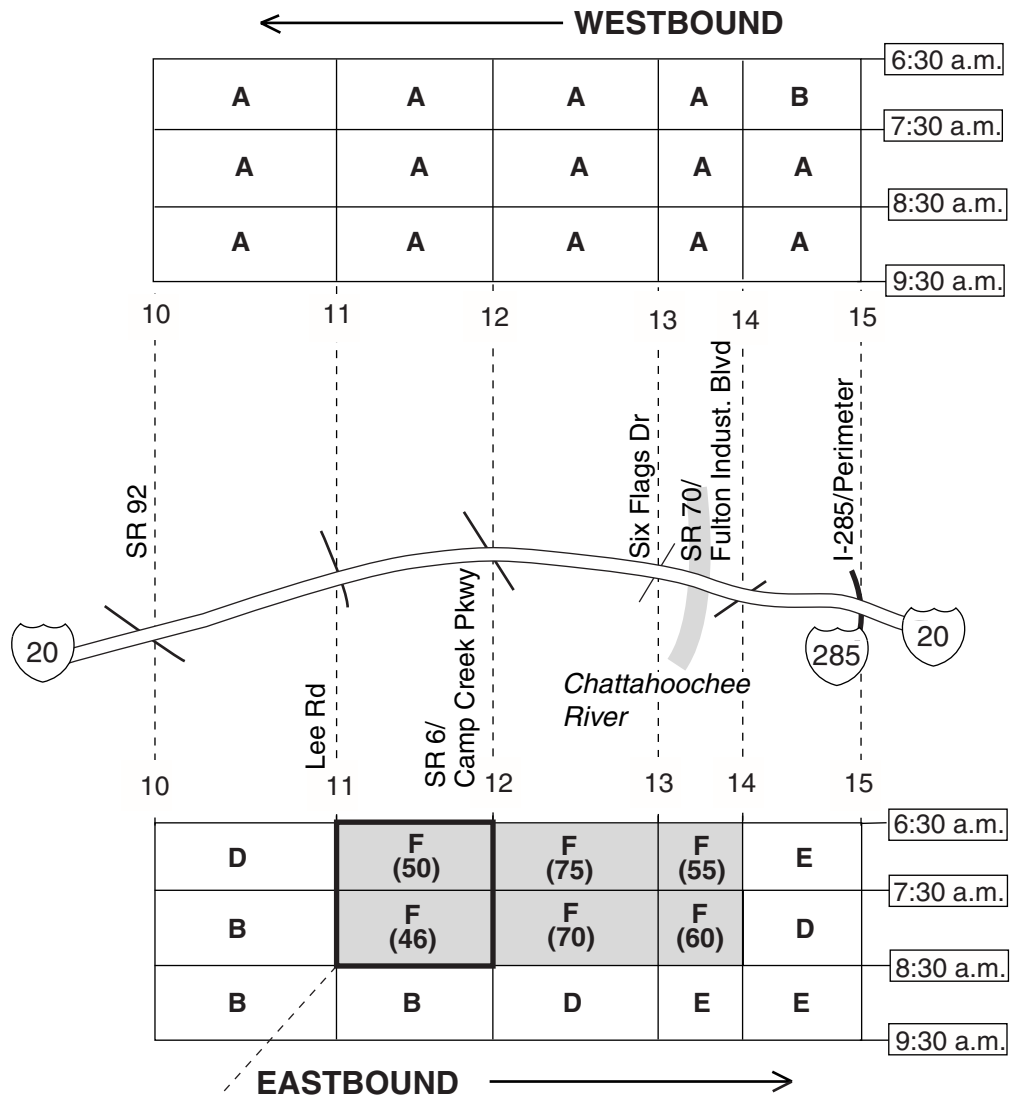


Before 8:30 a.m., a six to seven mile zone of eastbound congestion was found on I-20 between the vicinity of Lee Rd and Fulton Industrial Blvd; average estimated speeds typically ranged from approximately 25 to 35 mph. Congestion appeared to be caused or exacerbated by two separate lane drops (4 lanes to 3) in the vicinity of Six Flags Dr and Fulton Industrial Blvd.

FREEWAY TRAFFIC QUALITY

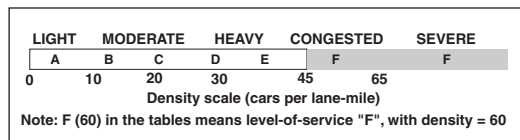
-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-20 (Between SR 92 & I -285) MORNING (FALL 2001)



These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 75 and 65 pcplpm with corresponding speed estimates of 25 to 30 mph.

LEVEL-OF-SERVICE LEGEND:

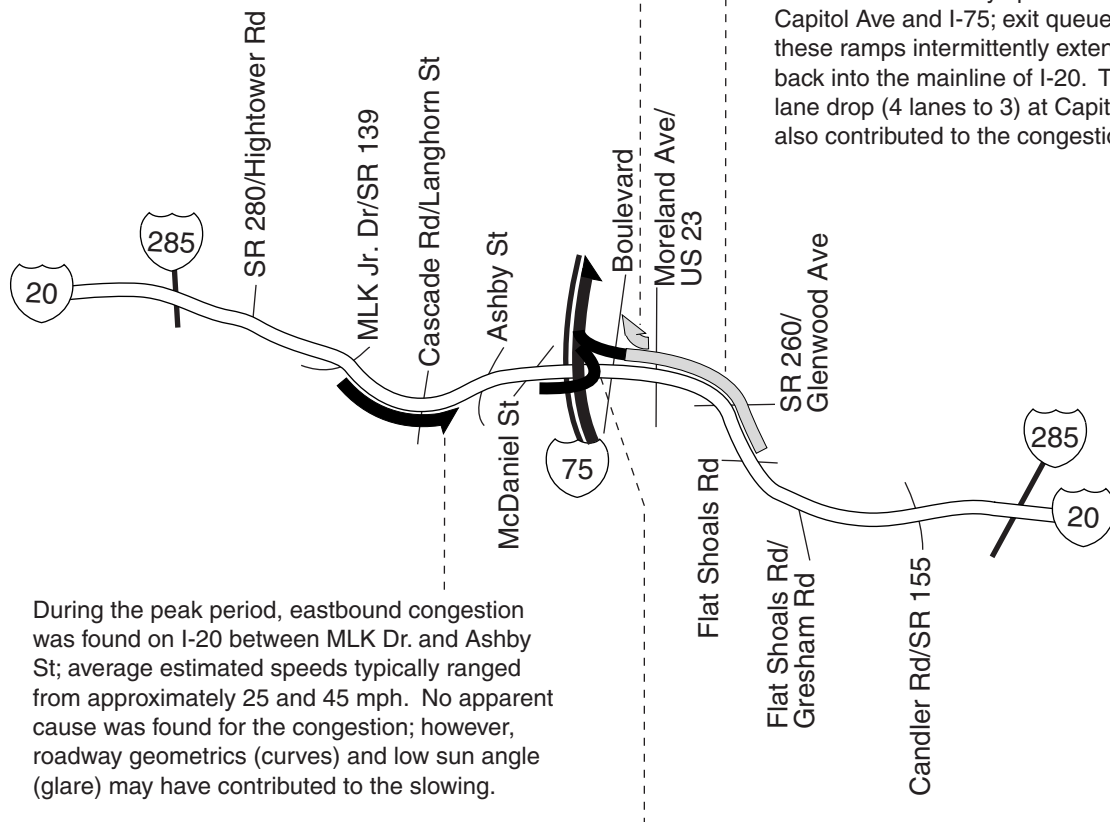




I-20 (Inside Perimeter) MORNING (FALL 2001)

During the peak period, congestion was found on the westbound exit ramp at Boulevard; when congested, approximately 20 to 30 vehicles per lane were queued at the signal at the head of the ramp (two right lanes).



Before 8:30 a.m., an extended zone of westbound congestion was found on I-20 between Flat Shoals Rd and I-75; average estimated speeds typically ranged from approximately 30 to 50 mph. The head of the queue was located at the closely spaced ramps at Capitol Ave and I-75; exit queues on these ramps intermittently extended back into the mainline of I-20. The lane drop (4 lanes to 3) at Capitol Ave also contributed to the congestion.



During the peak period, eastbound congestion was found on I-20 between MLK Dr. and Ashby St; average estimated speeds typically ranged from approximately 25 and 45 mph. No apparent cause was found for the congestion; however, roadway geometrics (curves) and low sun angle (glare) may have contributed to the slowing.

During the peak period, congestion was found on the exit ramp to I-75 (northbound); congestion appeared to be caused or exacerbated by the merge into congested flow on I-75. At its maximum observed extent, the ramp was completely filled with queued vehicles.

FREEWAY TRAFFIC QUALITY

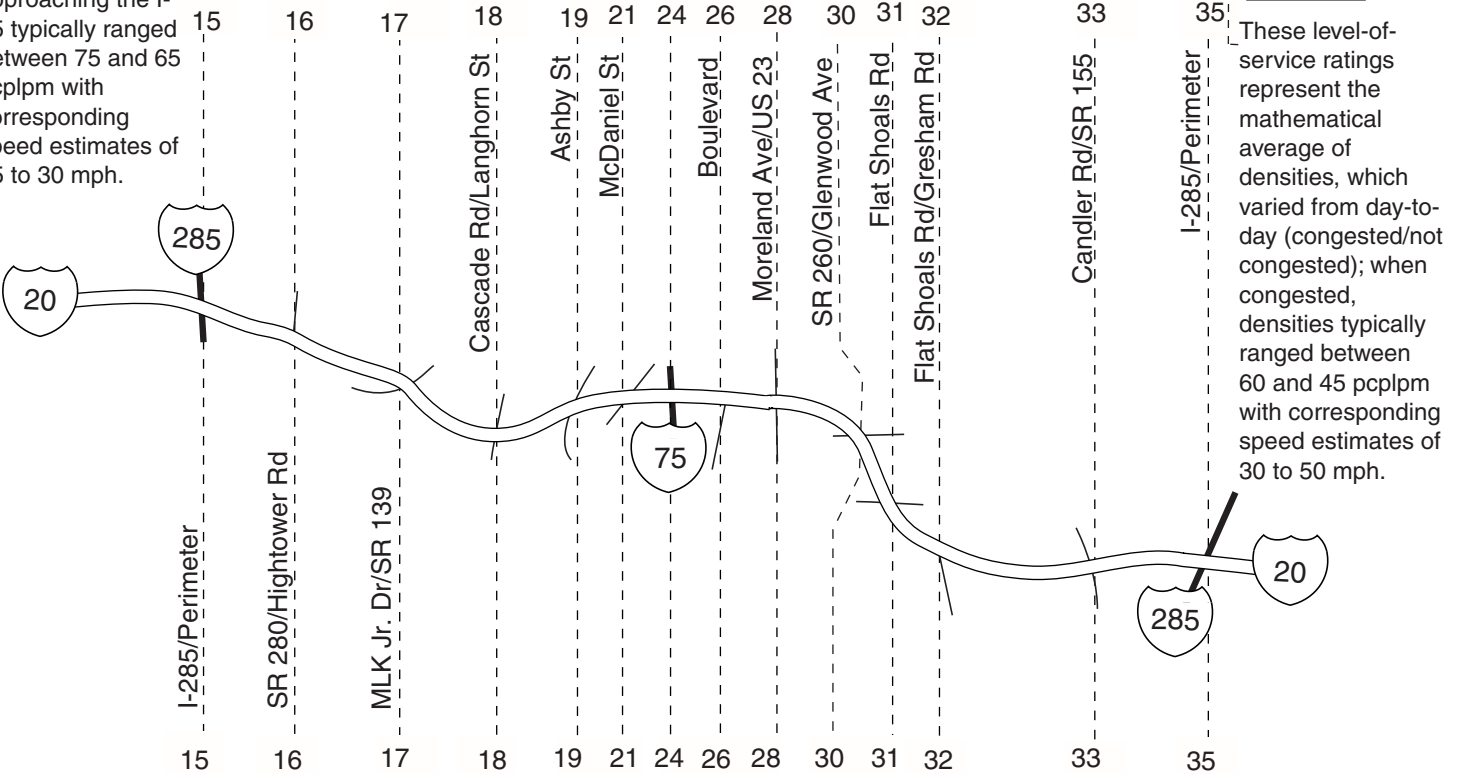
-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-20 (Inside Perimeter) MORNING (FALL 2001)

These level-of-service ratings represent the mathematical average of densities, which varied widely between the right- and left-hand lanes. When congested, densities in the right two lanes approaching the I-75 typically ranged between 75 and 65 pcplpm with corresponding speed estimates of 25 to 30 mph.

← WESTBOUND

A	B	A	B	B	B	F (55)	E	F (46)	E	D	D	D	6:30 a.m.
A	A	B	B	A	B	F (65)	F (46)	E	E	C	D	C	7:30 a.m.
A	A	B	B	B	B	D	C	B	C	B	C	B	8:30 a.m.
													9:30 a.m.



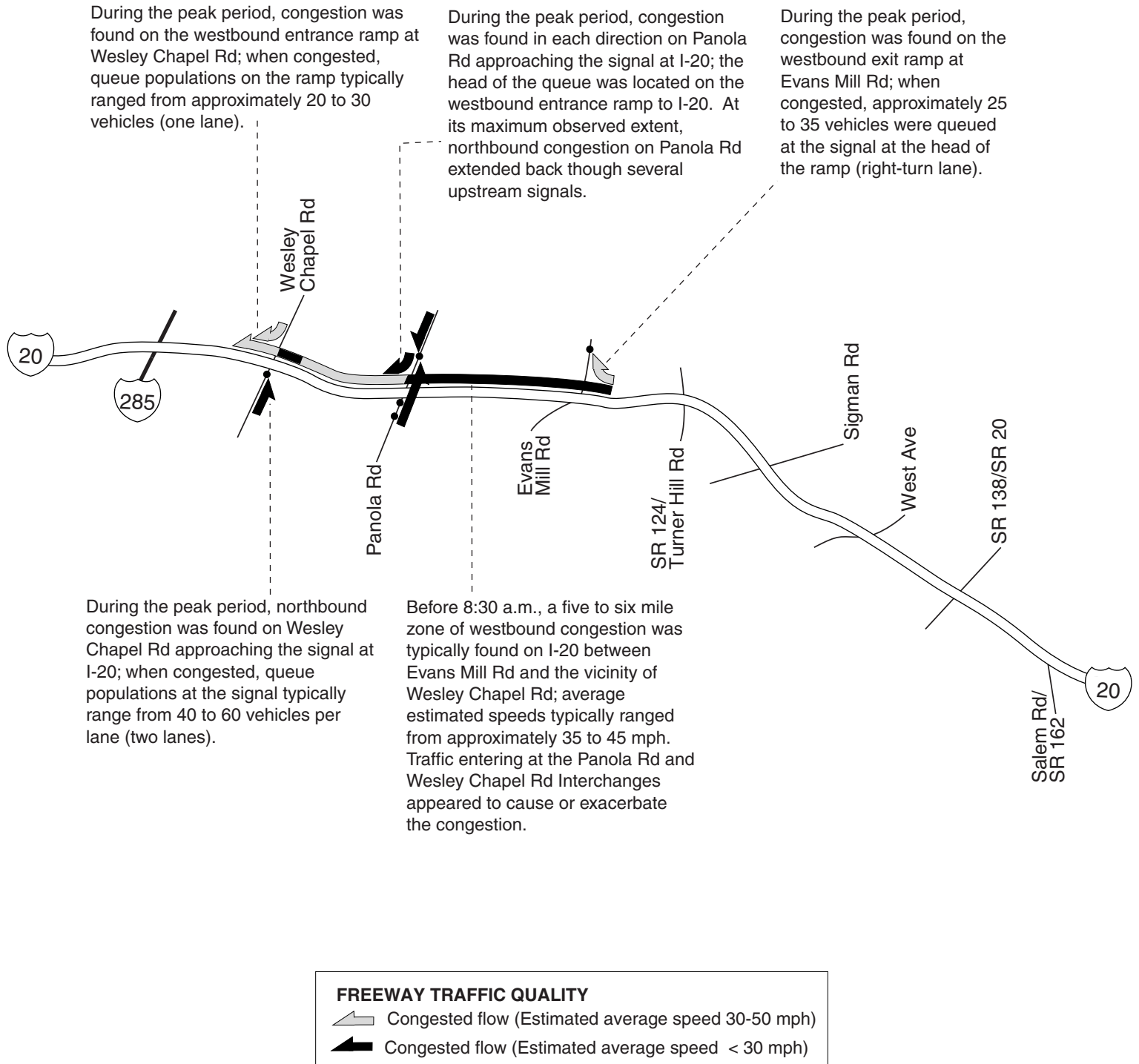
C	C	C	D	C	B	B	B	A	A	A	A	A	6:30 a.m.
C	C	F (75)	E	C	B	B	B	A	A	A	A	A	7:30 a.m.
C	C	D	D	B	B	B	B	A	A	A	A	A	8:30 a.m.
													9:30 a.m.

EASTBOUND →

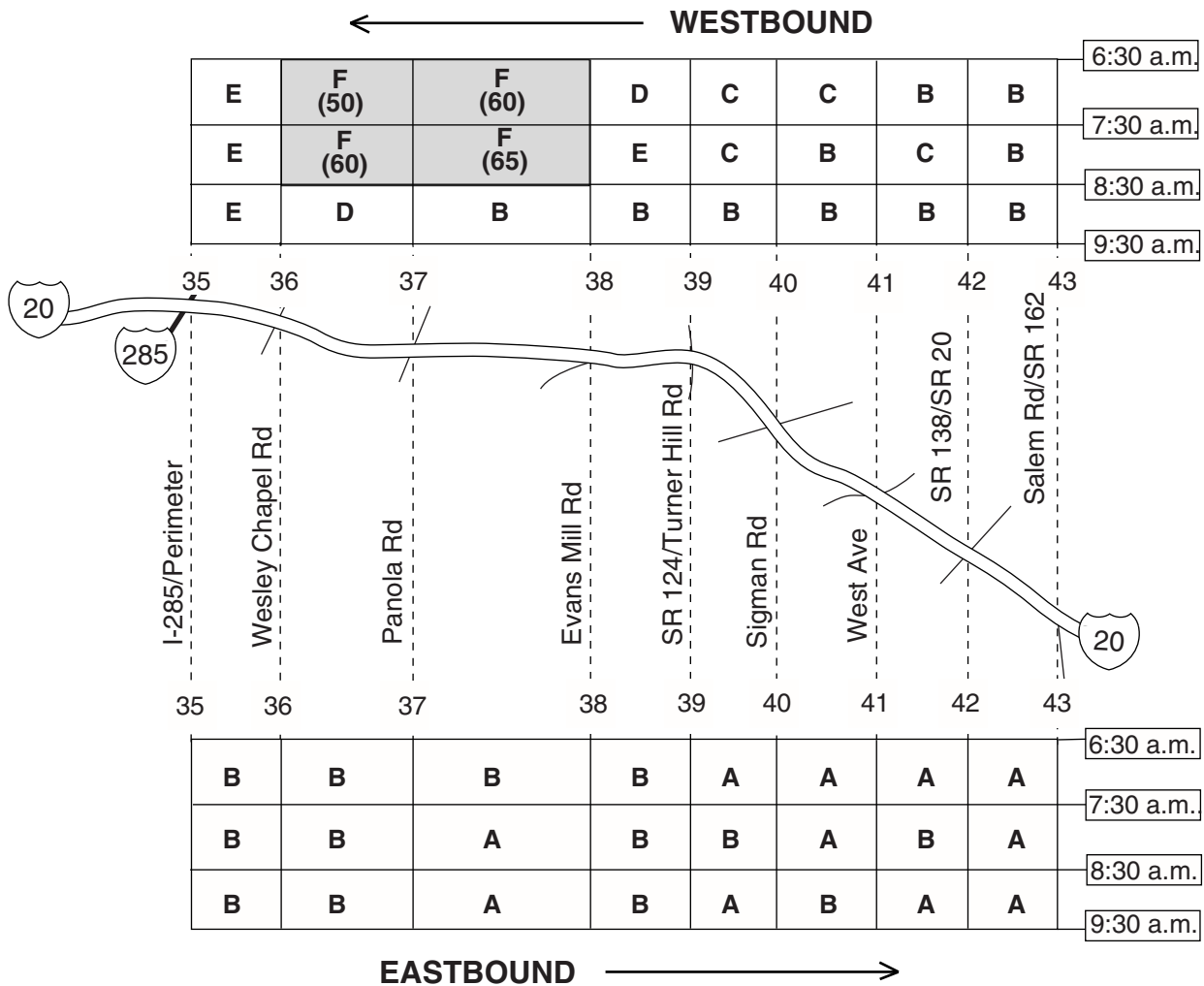
LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									

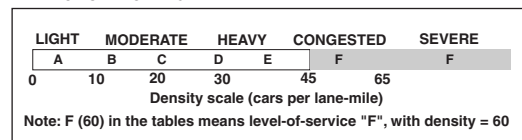
I-20 (Between I-285 & Salem Rd) MORNING (FALL 2001)



I-20 (Between I-285 & Salem Rd) MORNING (FALL 2001)



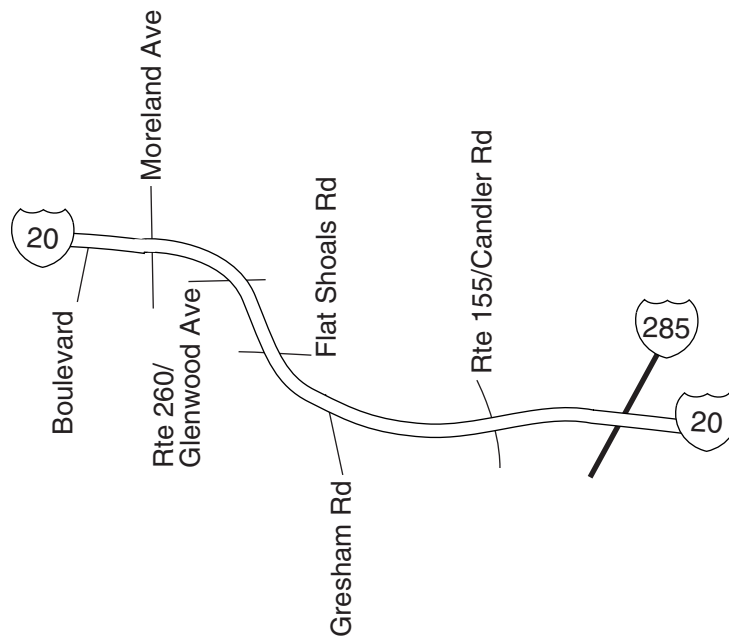
LEVEL-OF-SERVICE LEGEND:







I-20 (HOV) MORNING (FALL 2001)

During the evening survey period, no congestion was found on the I-20 HOV facility.

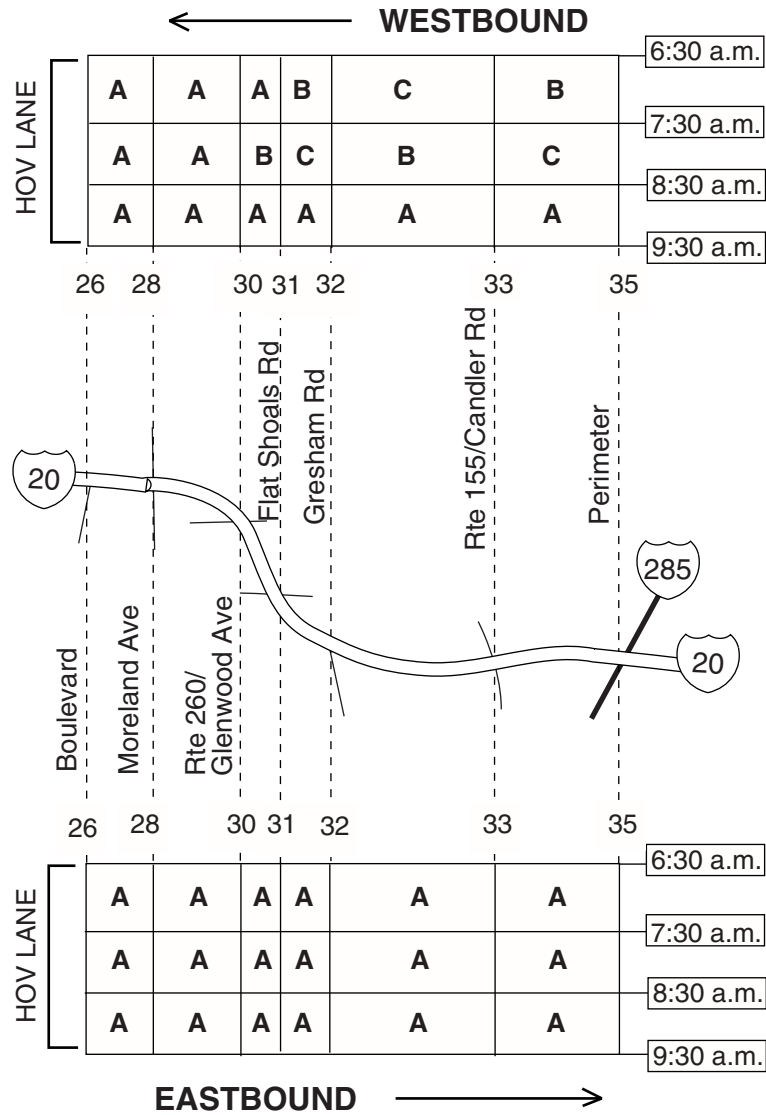


FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-20 (HOV)

MORNING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

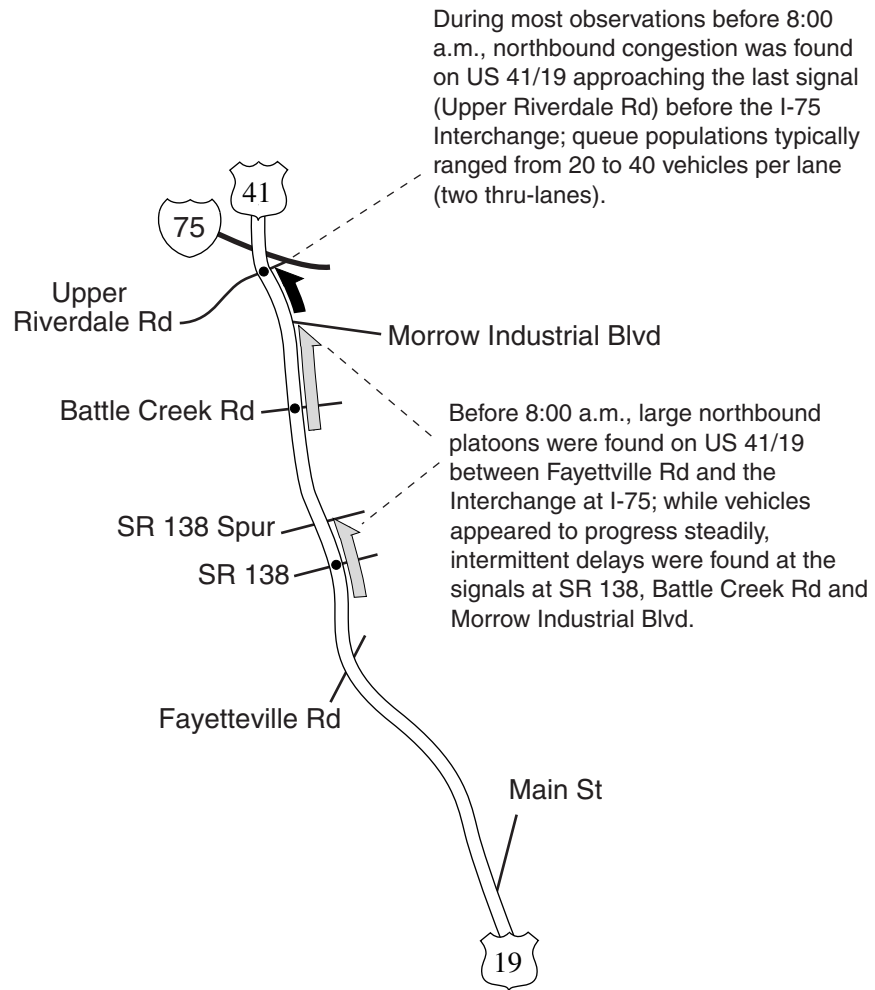
LIGHT		MODERATE		HEAVY		CONGESTED	SEVERE
A	B	C	D	E	F	F	F
0	10	20	30	45	65		

Density scale (cars per lane-mile)




Note: F (60) in the tables means level-of-service "F", with density = 60



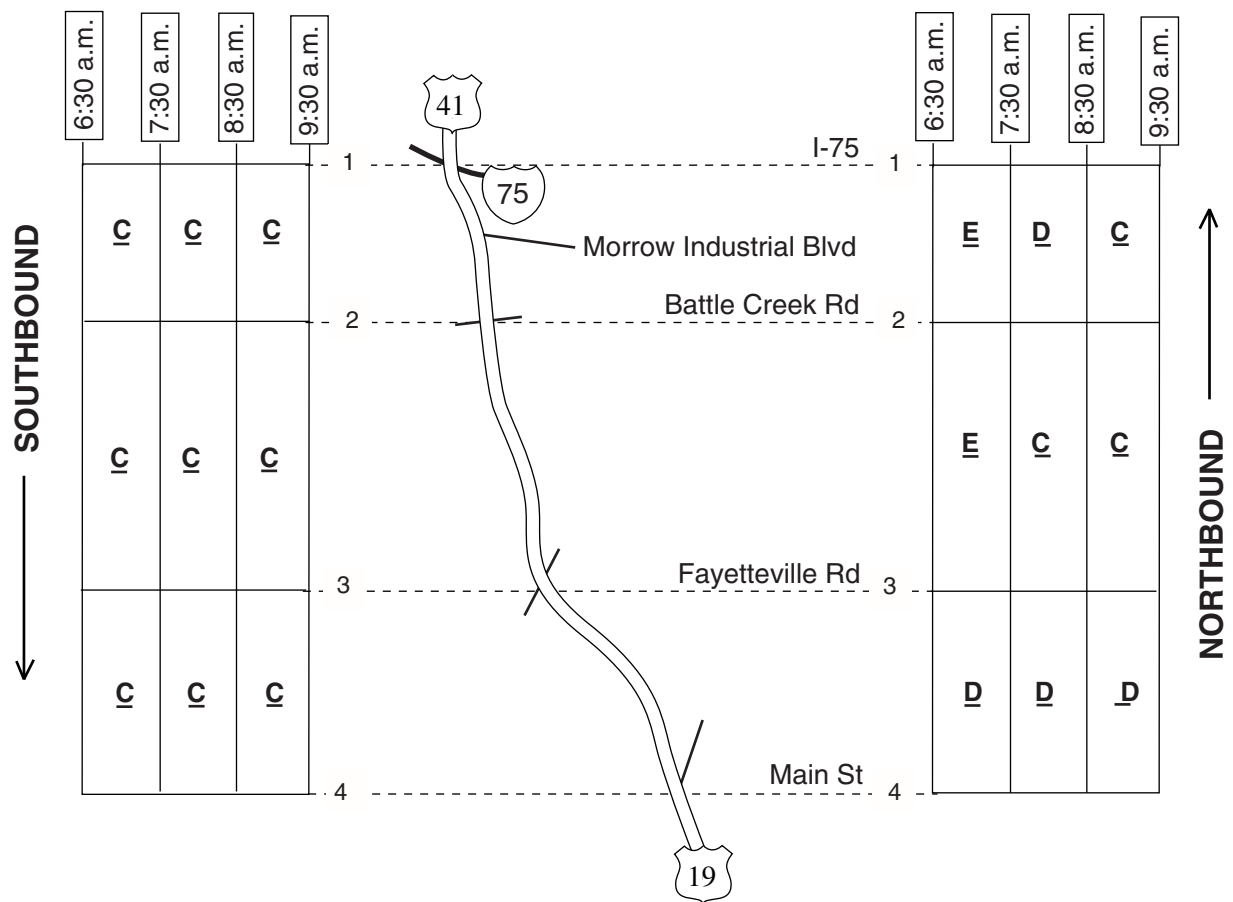
US 41 / 19 (TARA BLVD) (Clayton County) MORNING (FALL 2001)



SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

**US 41 / 19 (TARA BLVD)
(Clayton County.)
MORNING (FALL 2001)**

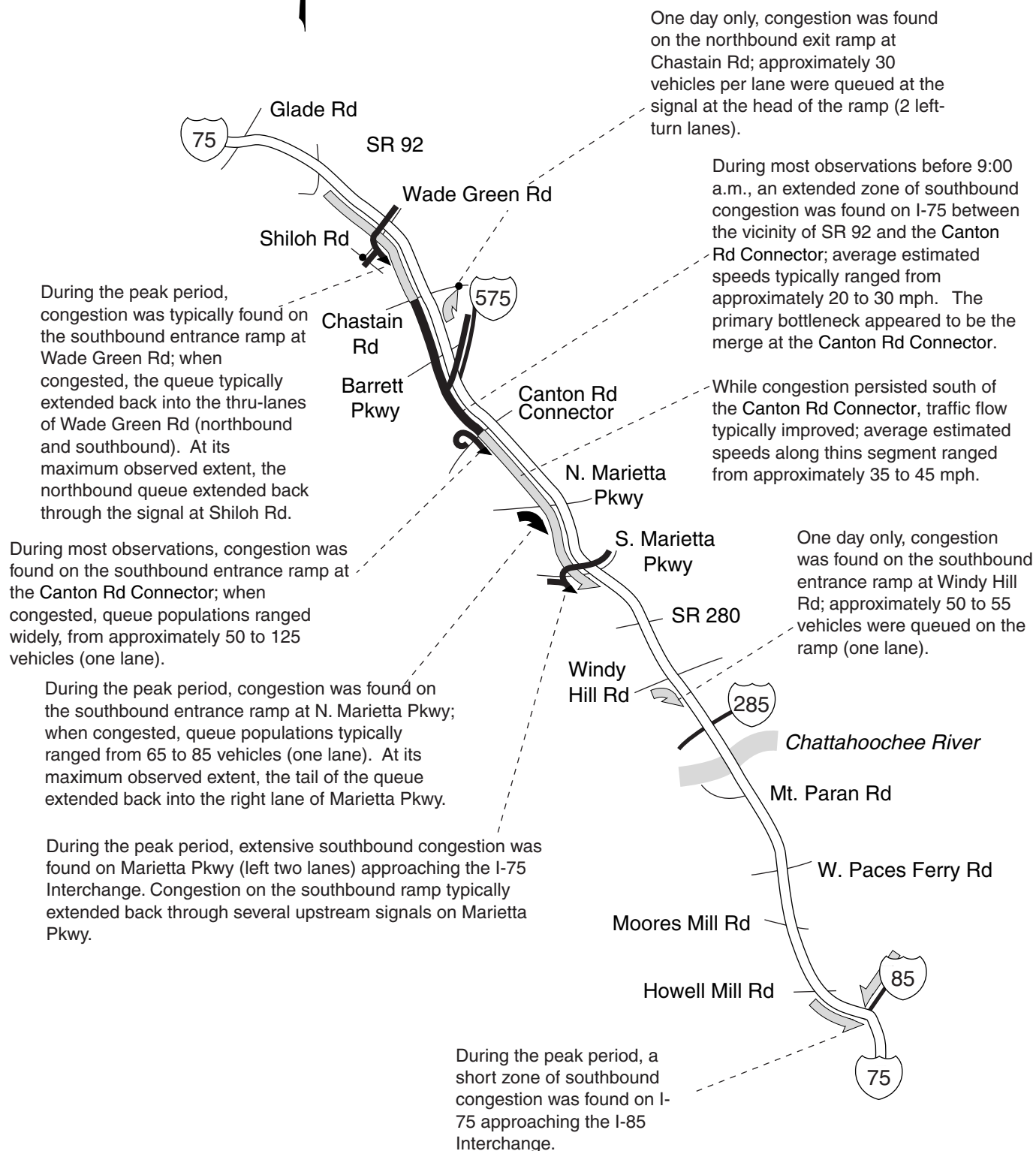


SURROGATE LEVEL-OF-SERVICE LEGEND:



LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F



I-75 (Between Glade Rd & I-85) MORNING (FALL 2001)

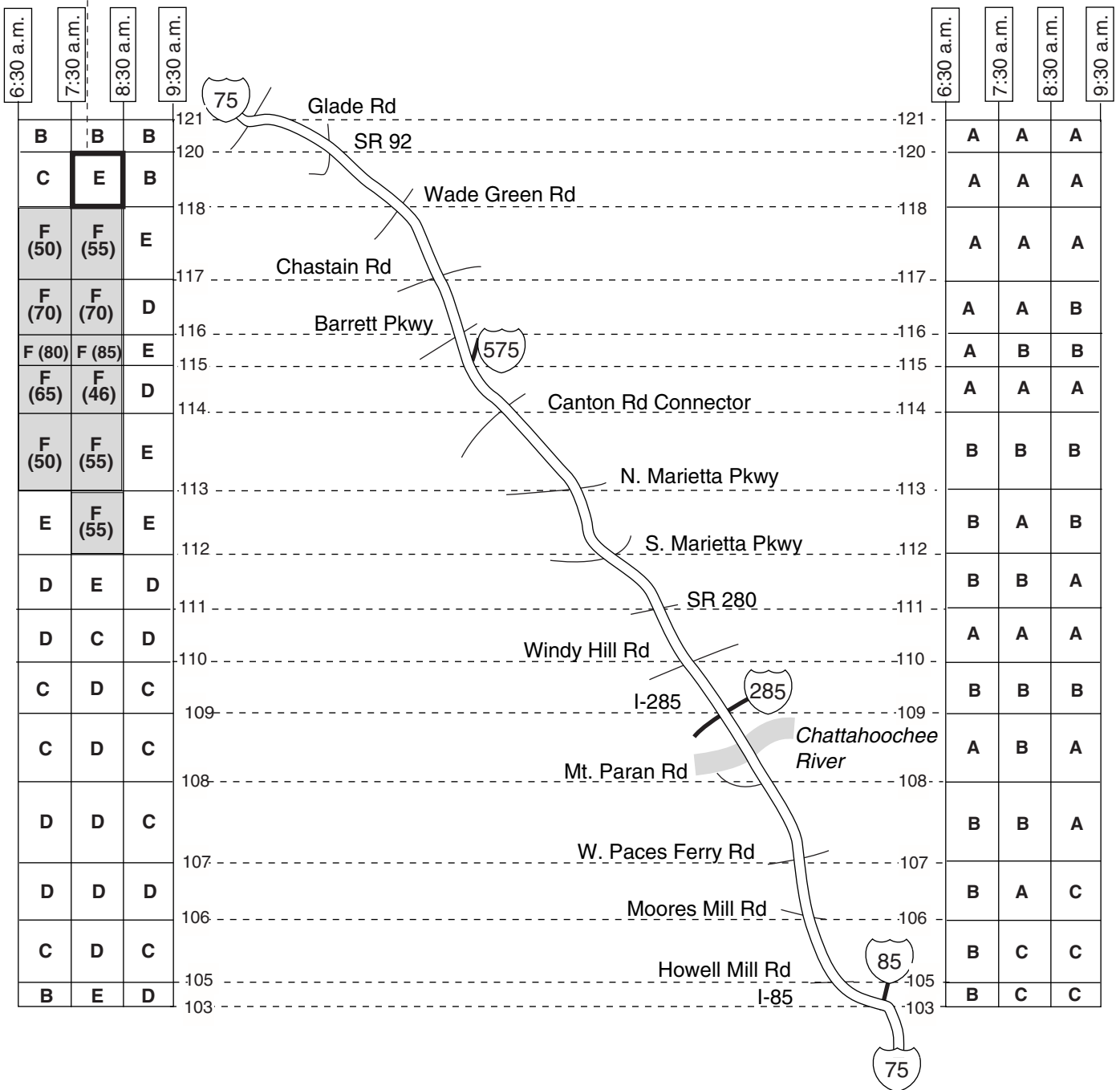


FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-75 (Between Glade Rd & I-85) MORNING (FALL 2001)

These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 70 and 60 pcplpm with corresponding speed estimates of 25 to 30 mph.



LEVEL-OF-SERVICE LEGEND:

LIGHT	MODERATE	HEAVY	CONGESTED	SEVERE
A	B	C	D	E
0	10	20	30	45
Density scale (cars per lane-mile)				
Note: F (60) in the tables means level-of-service "F", with density = 60				

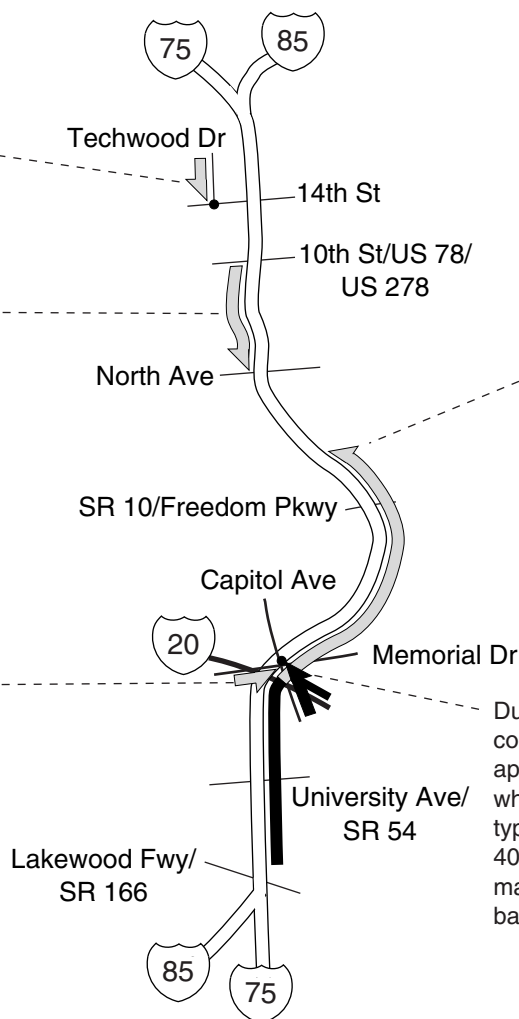


I-75 / 85 MORNING (FALL 2001)

Intermittently, southbound congestion was found on Techwood Dr approaching the signal at 14th St; when congested, queue populations typically ranged from approximately 20 to 25 vehicles per lane (three lanes).

After 7:30 a.m., southbound congestion was found on I-75 between 10th St and North Ave; average estimated speeds typically ranged from approximately 40 to 50 mph. Congestion may have been caused or exacerbated by the weaving and merging associated with the North Ave Interchange.



Intermittently, eastbound congestion was found on Memorial Dr approaching the signal at Capitol Ave; when congested, queue populations typically ranged from approximately 25 to 35 vehicles (left-turn lane only).



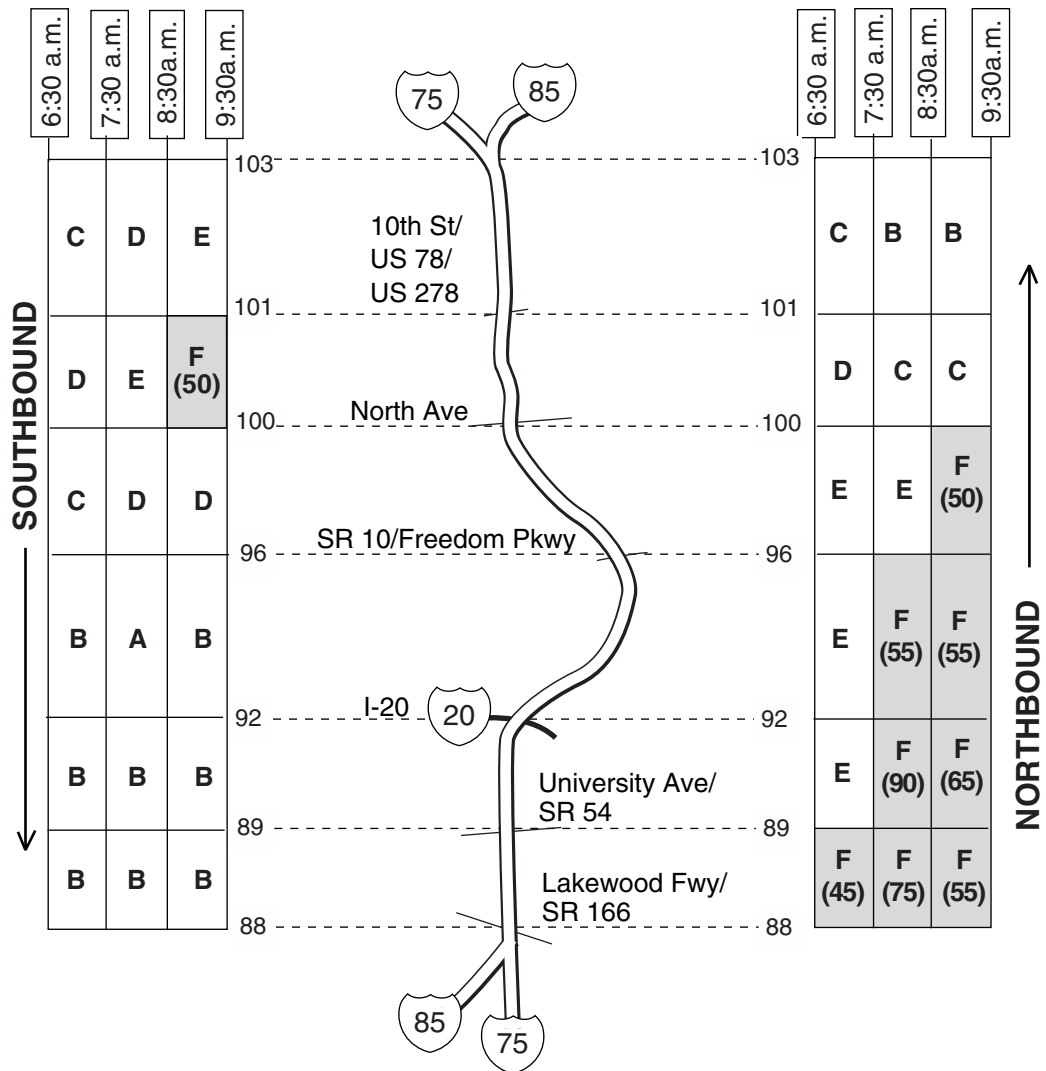
During most observations, northbound congestion was found on I-75 between the vicinity of SR 166 and I-20; average estimated speeds typically ranged from approximately 20 to 30 mph. Congestion appeared to be caused or exacerbated by traffic entering at the I-20 Interchange. While congestion persisted north of I-20, traffic flow typically improved; average estimated speeds along this segment typically ranged from 35 to 45 mph.

During the peak period, northbound congestion was found on Capitol Ave approaching the signal at Memorial Dr; when congested, queue populations typically ranged from approximately 30 to 40 vehicles per lane (2 thru-lanes). At its maximum observed extent, the extended back onto the I-20 exit ramp (westbound).

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-75 / 85 MORNING (FALL 2001)

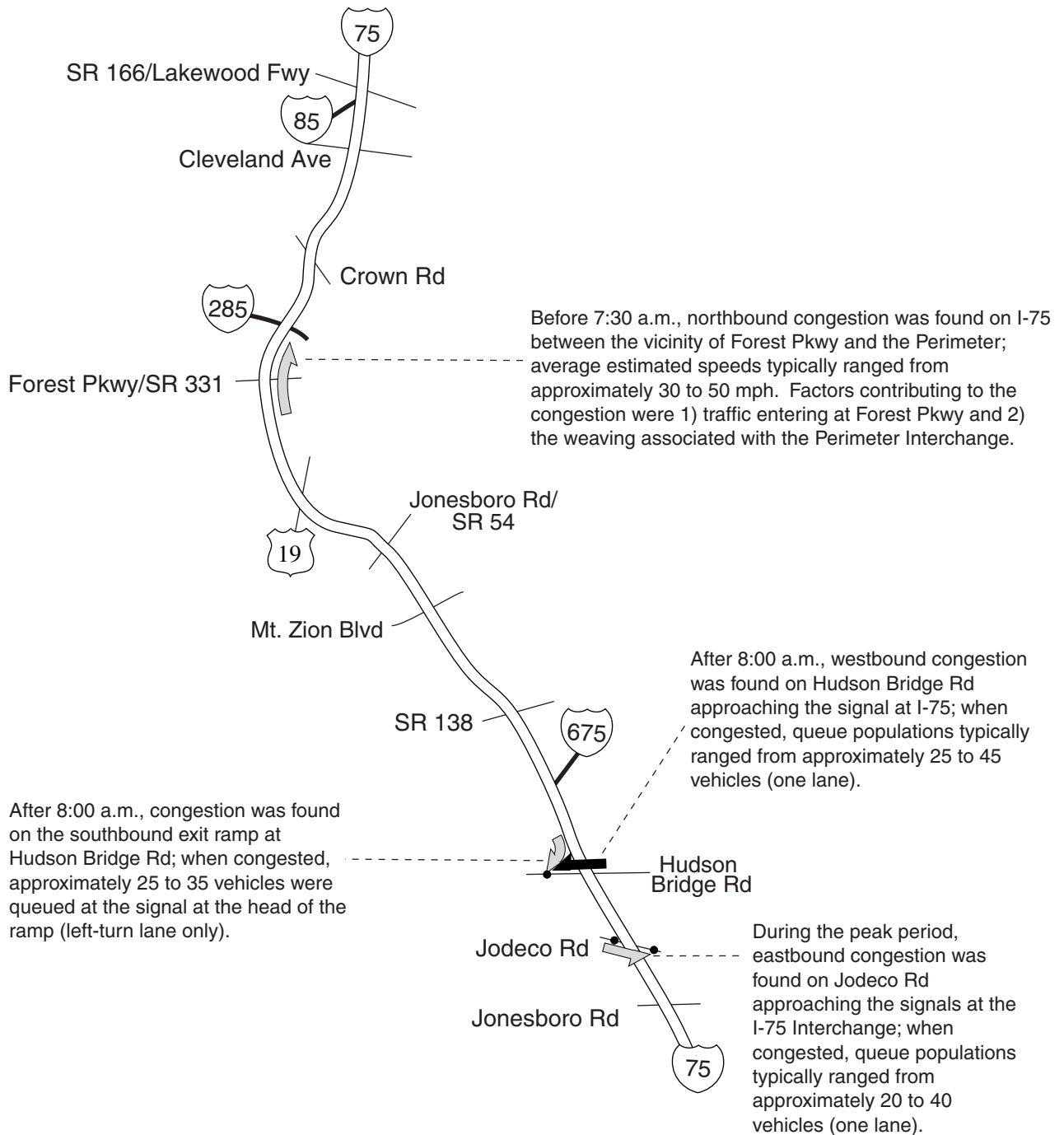


LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F		F	
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									



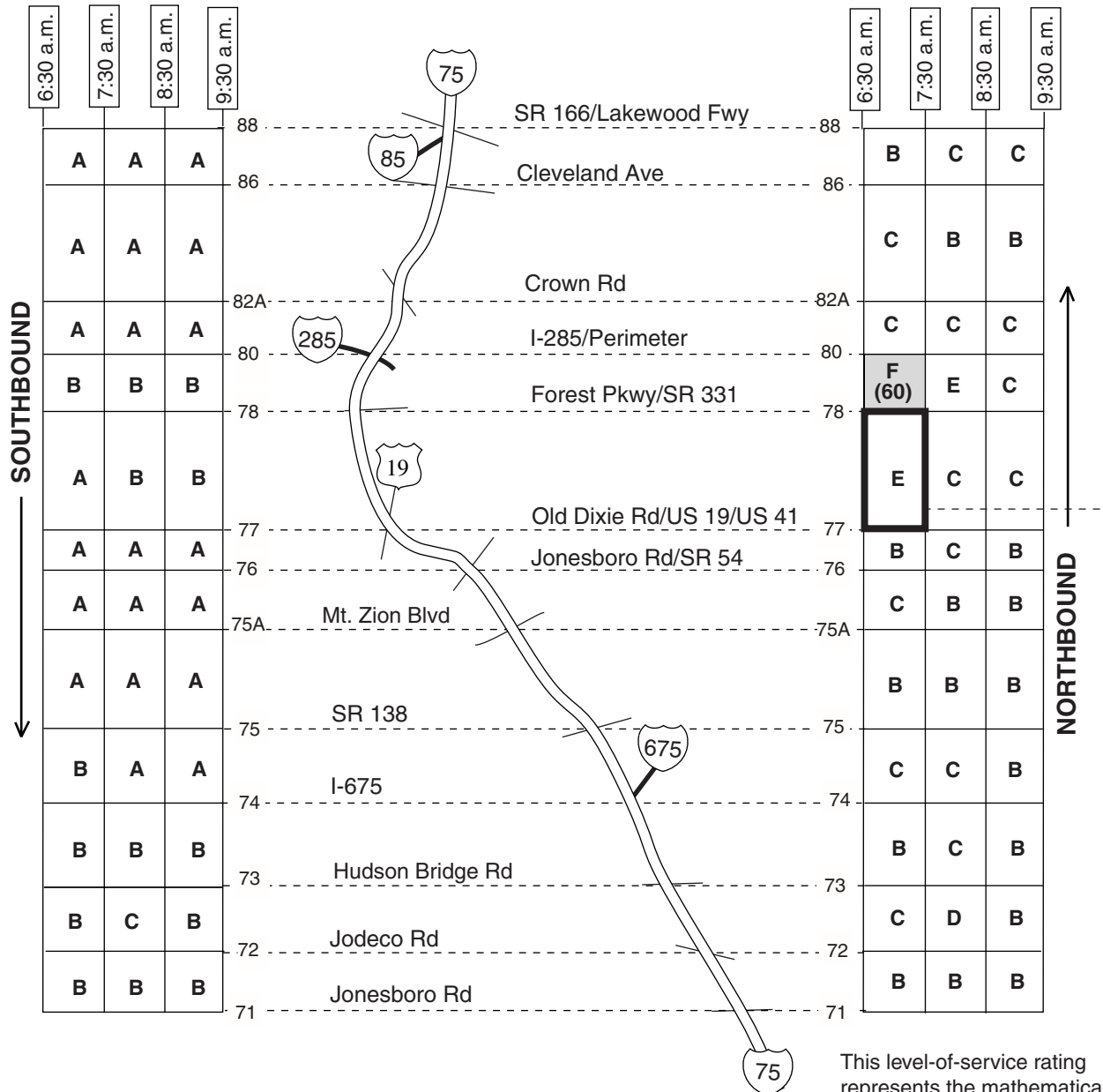
I-75 (Between I-85 & Jonesboro Rd) MORNING (FALL 2001)



FREEWAY TRAFFIC QUALITY

- Congested flow (Estimated average speed 30-50 mph)
- Congested flow (Estimated average speed < 30 mph)

I-75 (Between I-85 & Jonesboro Rd) MORNING (FALL 2001)



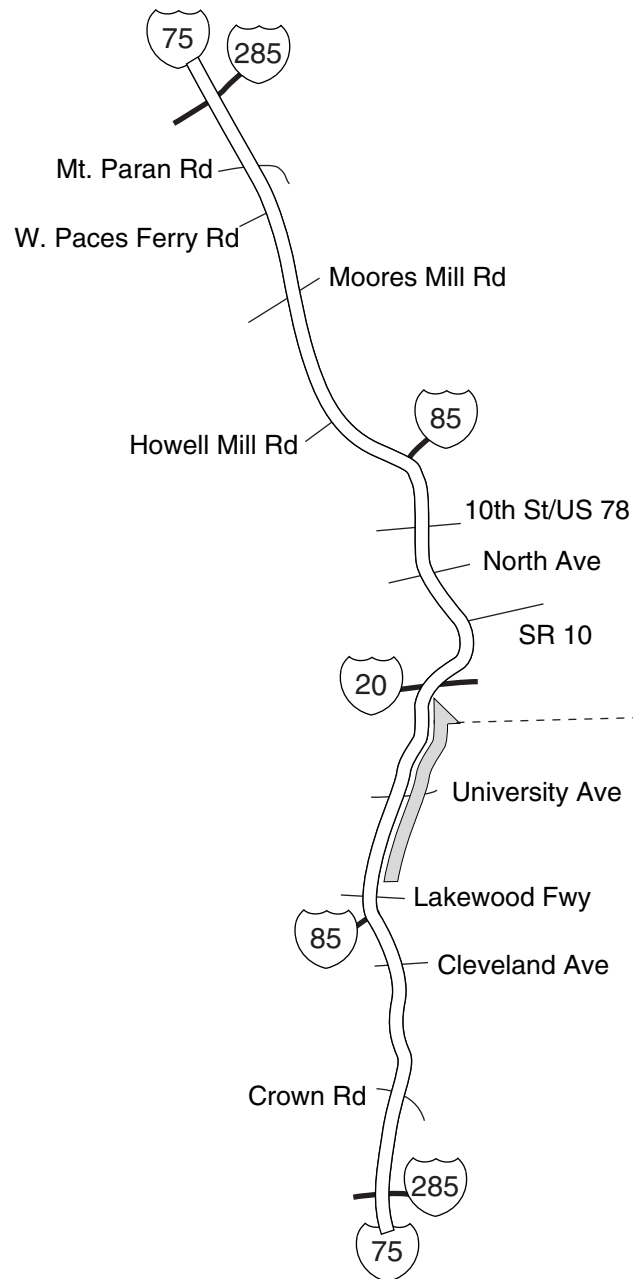
LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									

This level-of-service rating represents the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 60 and 55 pcplpm with corresponding speed estimates of 35 to 40 mph.





I-75 HOV MORNING (FALL 2001)

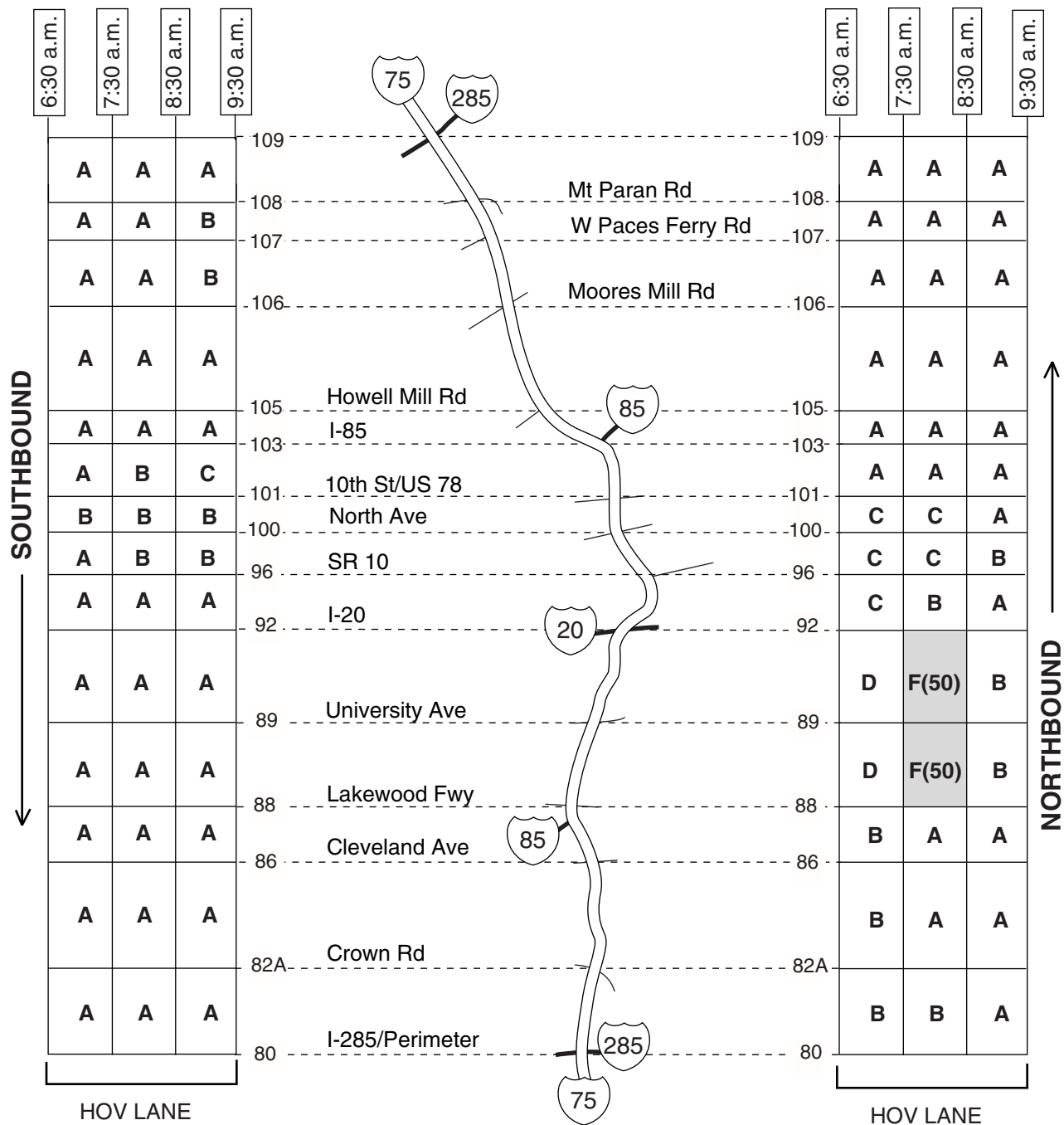


During the peak period, northbound congestion was found on the I-75 HOV lane between Lakewood Freeway and I-20; average estimated speeds typically ranged from approximately 40 to 45 mph.

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

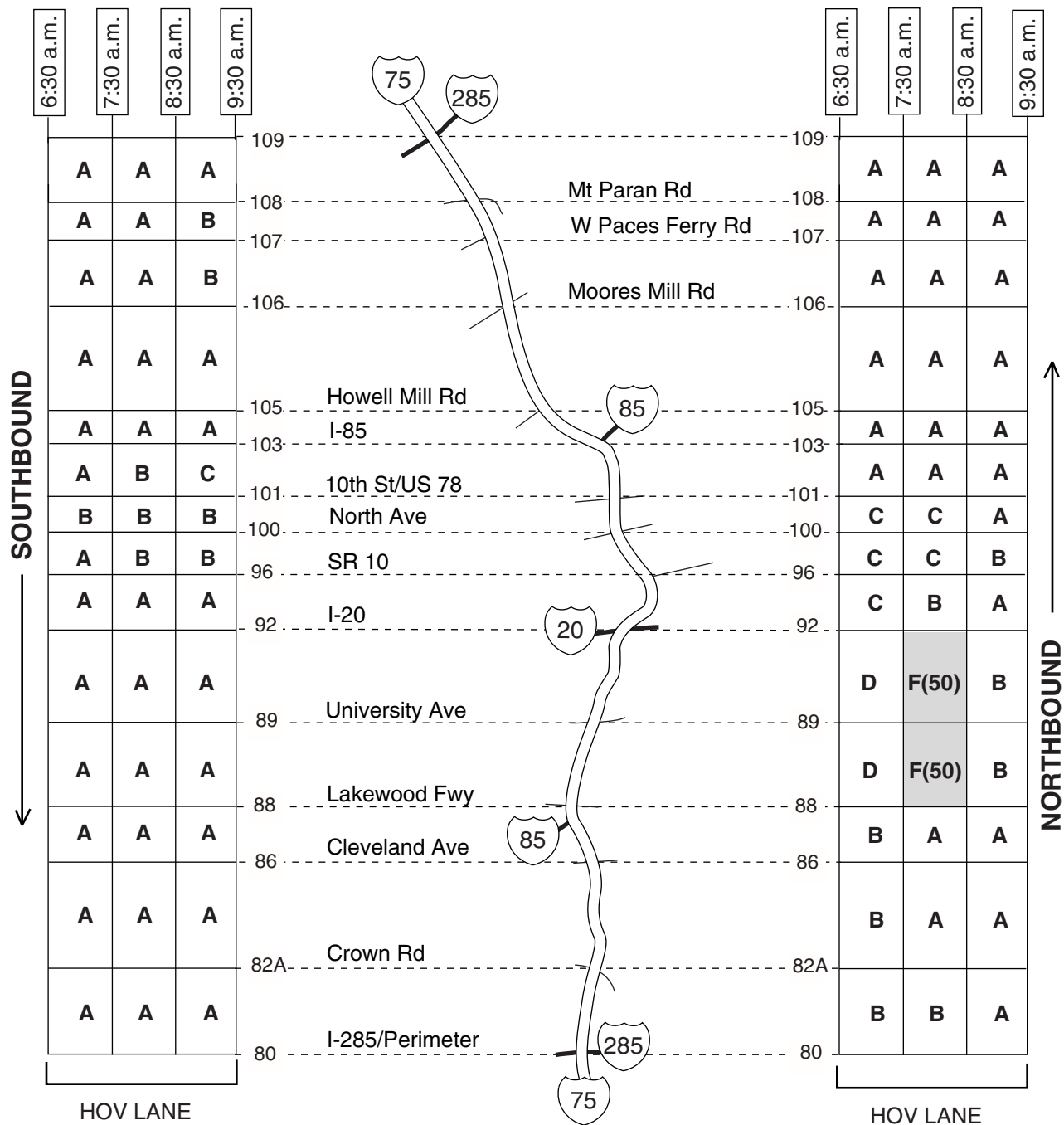
I-75 (HOV) MORNING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

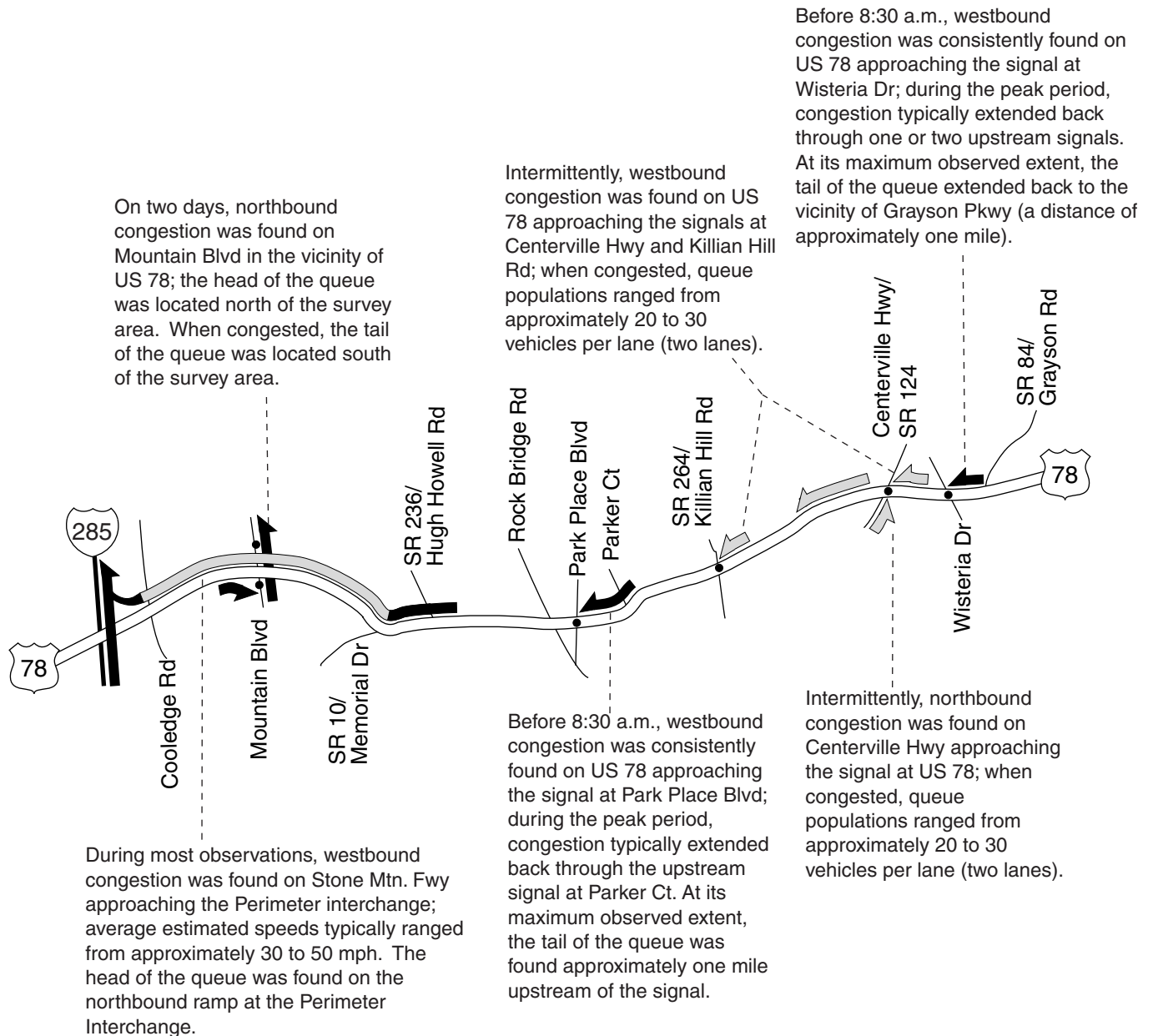
LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									

I-75 (HOV) MORNING (FALL 2001)





US 78 (STONE MOUNTAIN FWY) MORNING (FALL 2001)



FREEWAY TRAFFIC QUALITY

- Congested flow (Estimated average speed 30-50 mph)
- Congested flow (Estimated average speed < 30 mph)

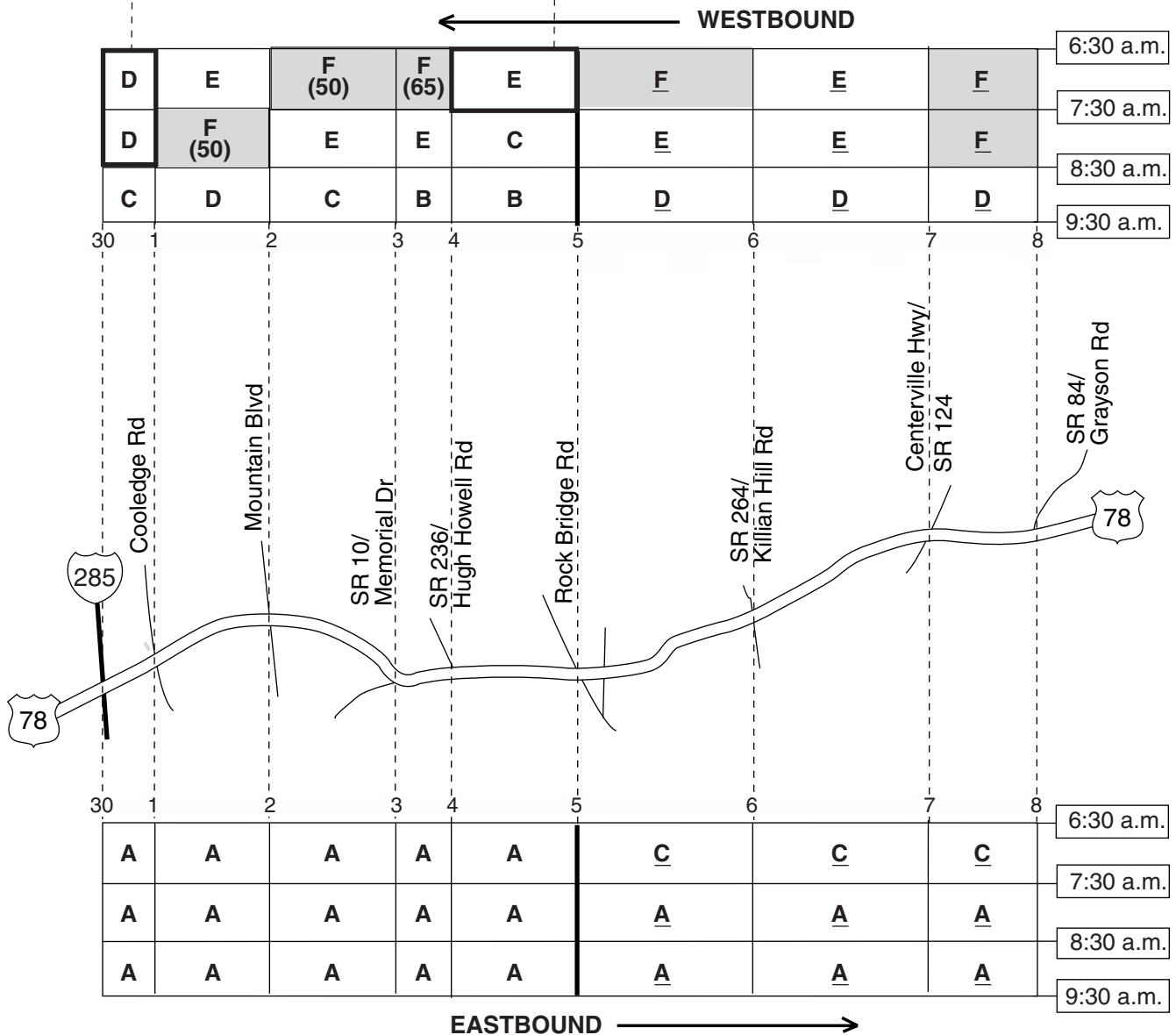
SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)

US 78 (STONE MOUNTAIN FWY) MORNING (FALL 2001)

These level-of-service ratings represent the mathematical average of densities, which varied widely between the right- and left-hand lanes. Congestion was typically found in the right lanes approaching the Perimeter.

This level-of-service rating represents the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 65 and 55 pcplpm with corresponding speed estimates of 30 to 35 mph.



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE
A	B	C	D	E	F	F		
0	10	20	30	45	65			

Density scale (cars per lane-mile)

Note: F (60) in the tables means level-of-service "F", with density = 60

SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED
A	B	C	D	E	F	

I-85 (Between SR 20 & I-75) MORNING (FALL 2001)

During the peak period, congestion was found on the southbound exit ramp at Lawrenceville Rd (SR 317); when congested, queue populations at the head of the ramp ranged widely, from approximately 25 to 55 vehicles (left-turn lane only).

During the peak period, southbound congestion was found on Satellite Blvd approaching the signal at Boggs Rd; when congested, queue populations typically ranged from approximately 20 to 25 vehicles per lane (two thru-lanes).

During the peak period, congestion was found on the southbound entrance ramp at Pleasant Hill Rd; when congested, queue populations typically ranged from approximately 25 to 35 vehicles (one thru-lane at merge).

During most observations, southbound congestion was found on I-85 between the vicinity of SR 120 (Duluth Hwy) and Indian Trail Rd; average estimated speeds ranged widely, from approximately 15 to 30 mph. The primary bottleneck was traffic entering at the Pleasant Hill Rd Interchange. South of Pleasant Hill Rd, traffic flow typically improved.

Intermittently, southbound congestion was found on the frontage road approaching the signal at Pleasantdale Rd; when congested, queue populations typically ranged from approximately 25 to 30 vehicles per lane (two thru-lanes).

During the peak period, southbound congestion was found on the frontage road in the vicinity of Pleasantdale Rd; the merge to one lane south of Pleasantdale Rd appeared to cause the congestion.

Intermittently, congestion was found on the southbound exit ramp at Druid Hills Rd; when congested, approximately 40 to 50 vehicles were queued at the head of the ramp (right-turn lane only).

During the peak period, southbound congestion was found on I-85 from the vicinity of Druid Hills Rd to I-75; average estimated speeds typically ranged from approximately 25 and 45 mph. The primary bottleneck was at the merge with traffic entering from SR 400; south of SR 400, traffic flow typically improved.

During the peak period, congestion was found on the southbound exit ramp at Boggs Rd; when congested, approximately 40 to 50 vehicles were queued at the head of the ramp (left-turn lane only).

Intermittently, westbound congestion was found on Old Norcross Rd approaching the signal at Satellite Blvd; when congested, queue populations typically ranged from approximately 25 to 35 vehicles per lane (two left-turn lanes).

During the peak period, congestion was found on the southbound entrance ramp at Steve Reynolds Blvd; when congested, queue populations ranged widely, from approximately 40 to 70 vehicles (one lane). At its maximum observed extent, the queue extended back into the right lane of Steve Reynolds Blvd.

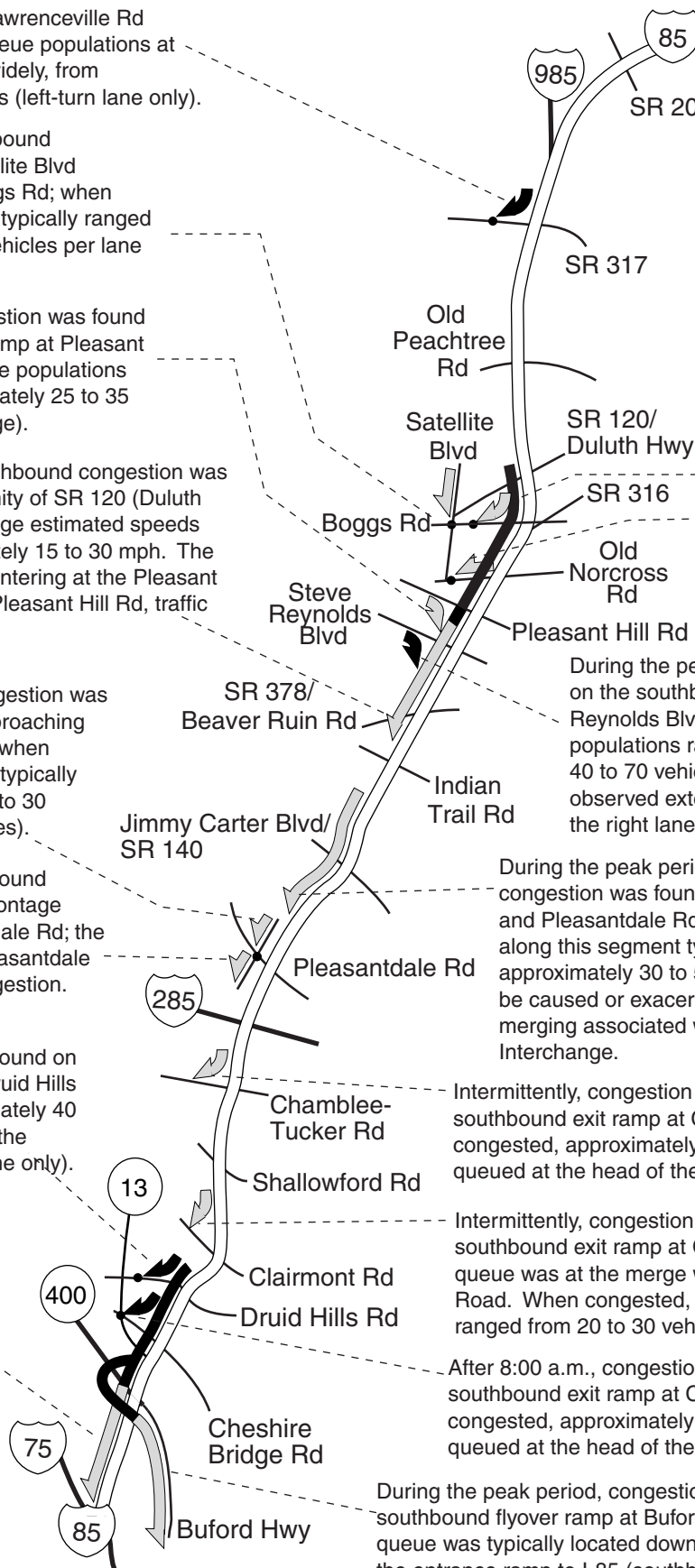
During the peak period, a short zone of southbound congestion was found on I-85 between Indian Trail Rd and Pleasantdale Rd; average estimated speeds along this segment typically ranged from approximately 30 to 50 mph. Congestion appeared to be caused or exacerbated by the weaving and merging associated with the Jimmy Carter Blvd Interchange.

Intermittently, congestion was found on the southbound exit ramp at Chamblee-Tucker Rd; when congested, approximately 35 to 45 vehicles were queued at the head of the ramp (right-turn lane only).

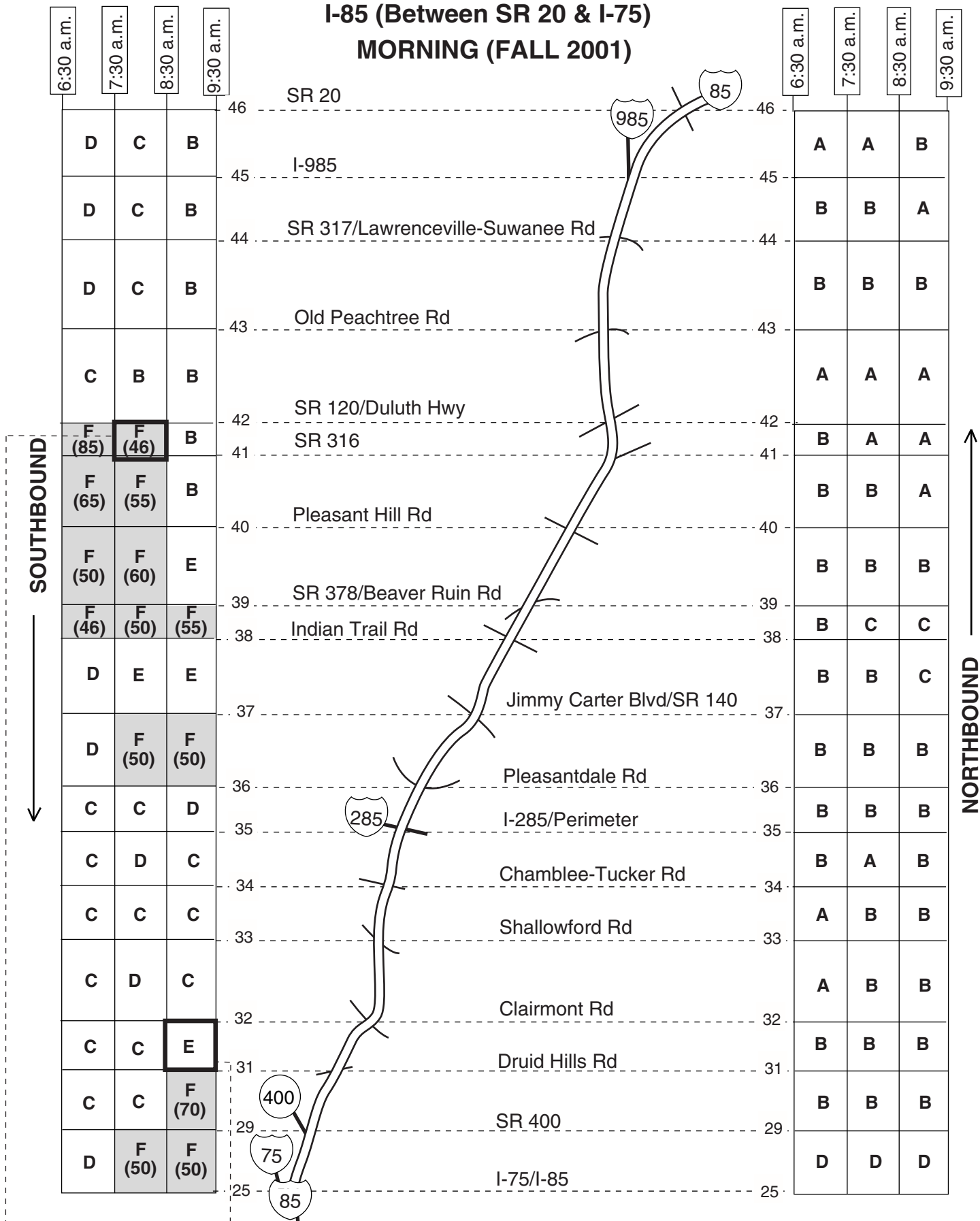
Intermittently, congestion was found on the southbound exit ramp at Clairmont Rd; the head of the queue was at the merge with traffic on the Frontage Road. When congested, queue populations typically ranged from 20 to 30 vehicles. (one lane at the merge).

After 8:00 a.m., congestion was typically found on the southbound exit ramp at Cheshire Bridge Rd; when congested, approximately 40 to 50 vehicles were queued at the head of the ramp (right-turn lane only).

During the peak period, congestion was found on the southbound flyover ramp at Buford Hwy; the head of the queue was typically located downstream on Buford Hwy at the entrance ramp to I-85 (southbound).



I-85 (Between SR 20 & I-75) MORNING (FALL 2001)

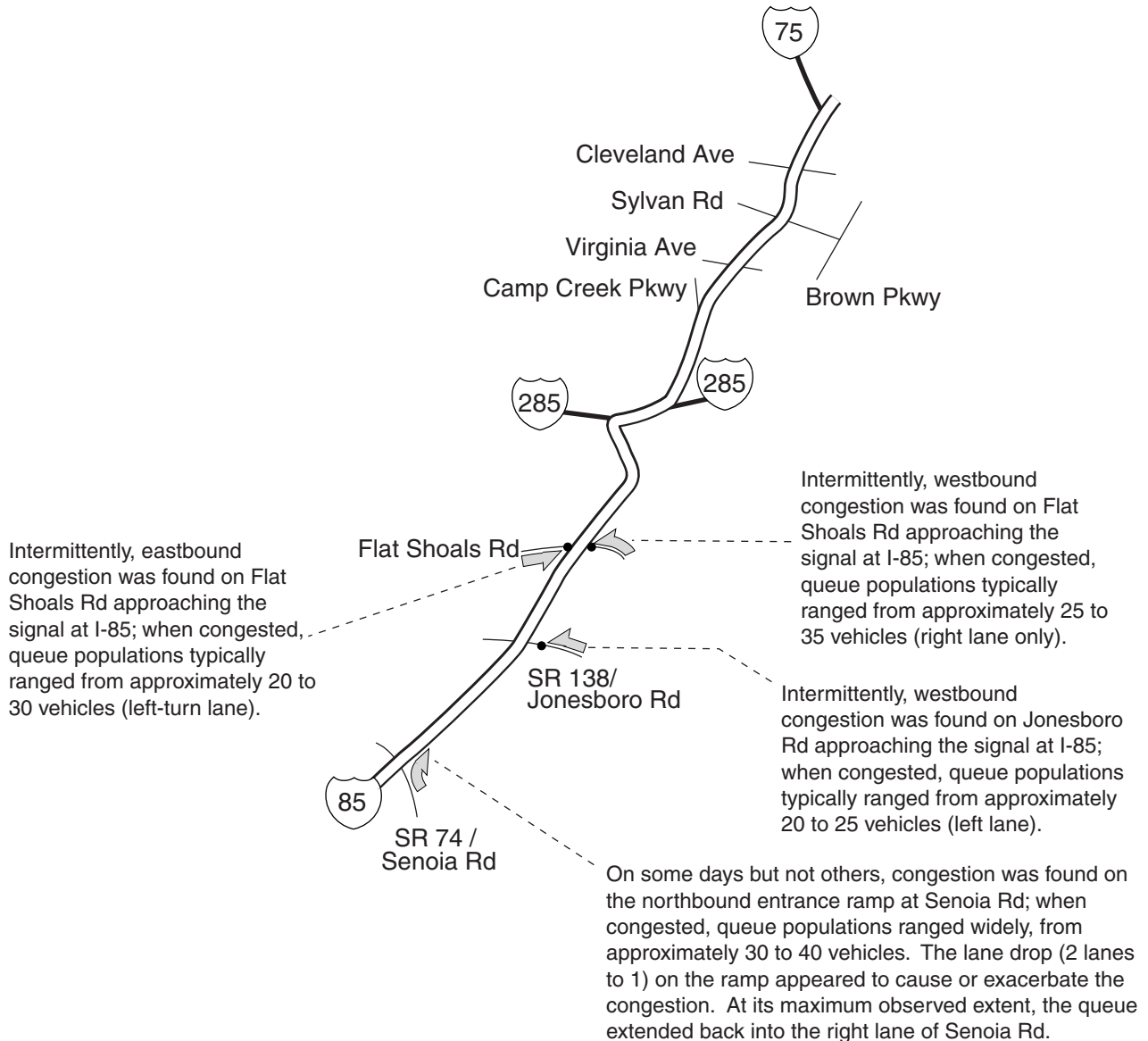


This level-of-service rating represents the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 100 and 80 pcplpm with corresponding speed estimates of 15 to 20 mph.



This level-of-service rating represents the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 70 and 60 pcplpm with corresponding speed estimates of 25 to 35 mph.



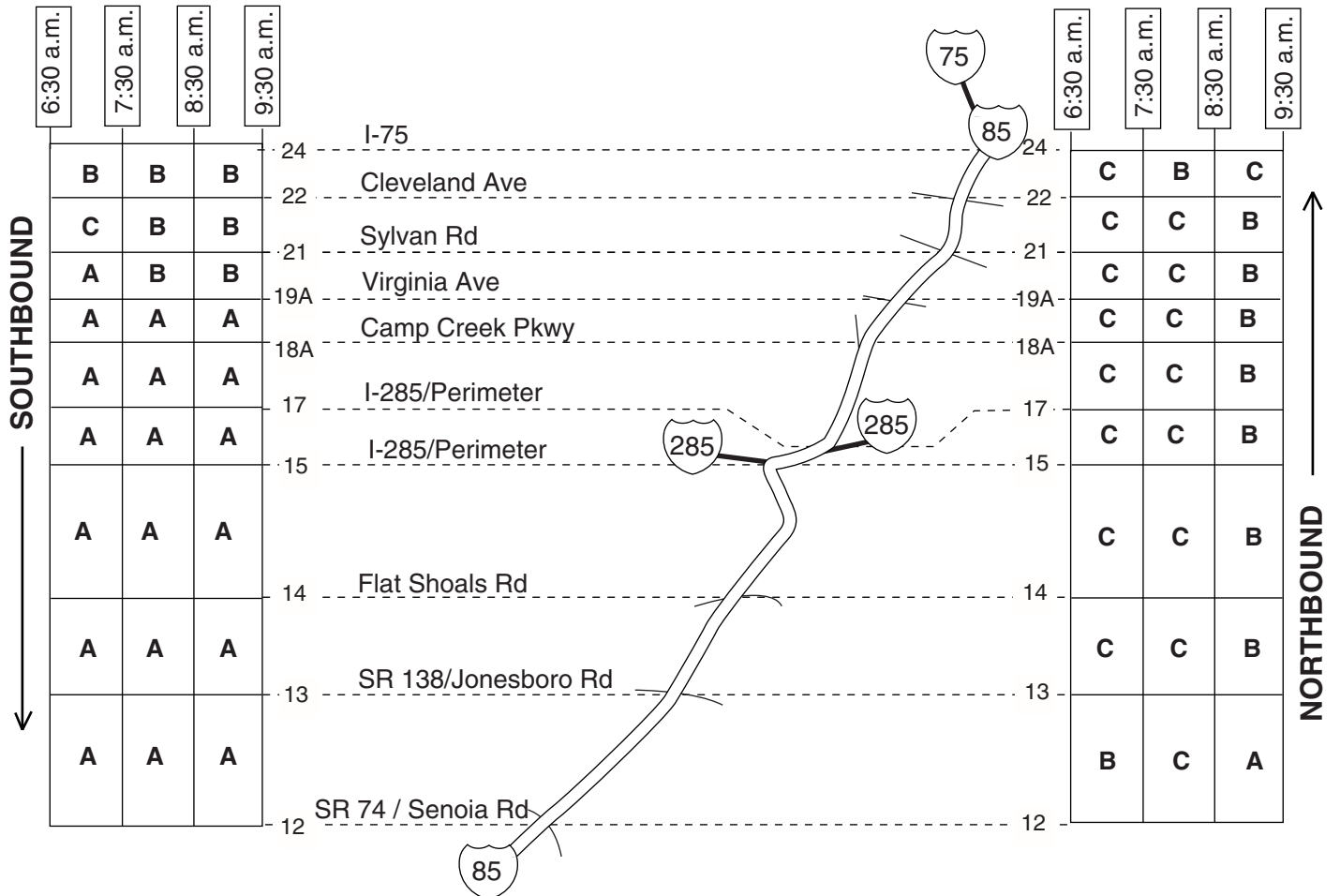
I-85 (Between I-75 and SR 74) MORNING (FALL 2001)



FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-85 (Between I-75 and SR 74) MORNING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									



I-85 (Between SR 74 & US 29) MORNING (FALL 2001)

Intermittently, southbound congestion was found on South Oaks MHP approaching the signal at Weldon Rd; when congested, approximately 35 to 45 vehicles were queued at the signal (one lane).

SR 74 /
Senoia Rd



On some days but not others, congestion was found on the northbound entrance ramp at Senoia Rd; when congested, queue populations ranged widely, from approximately 30 to 40 vehicles. The merge to one lane on the ramp appeared to cause the congestion.

S. Oaks
MHP

Weldon Rd

During the peak period, eastbound congestion was found on SR 154 approaching the signal at I-85; when congested, approximately 45 to 55 vehicles were queued at the signal (one lane). Construction at the I-85 Interchange may have contributed to the congestion.

SR 154/
McCollum-Sharpsburg Rd

SR 34




US 29/SR 16



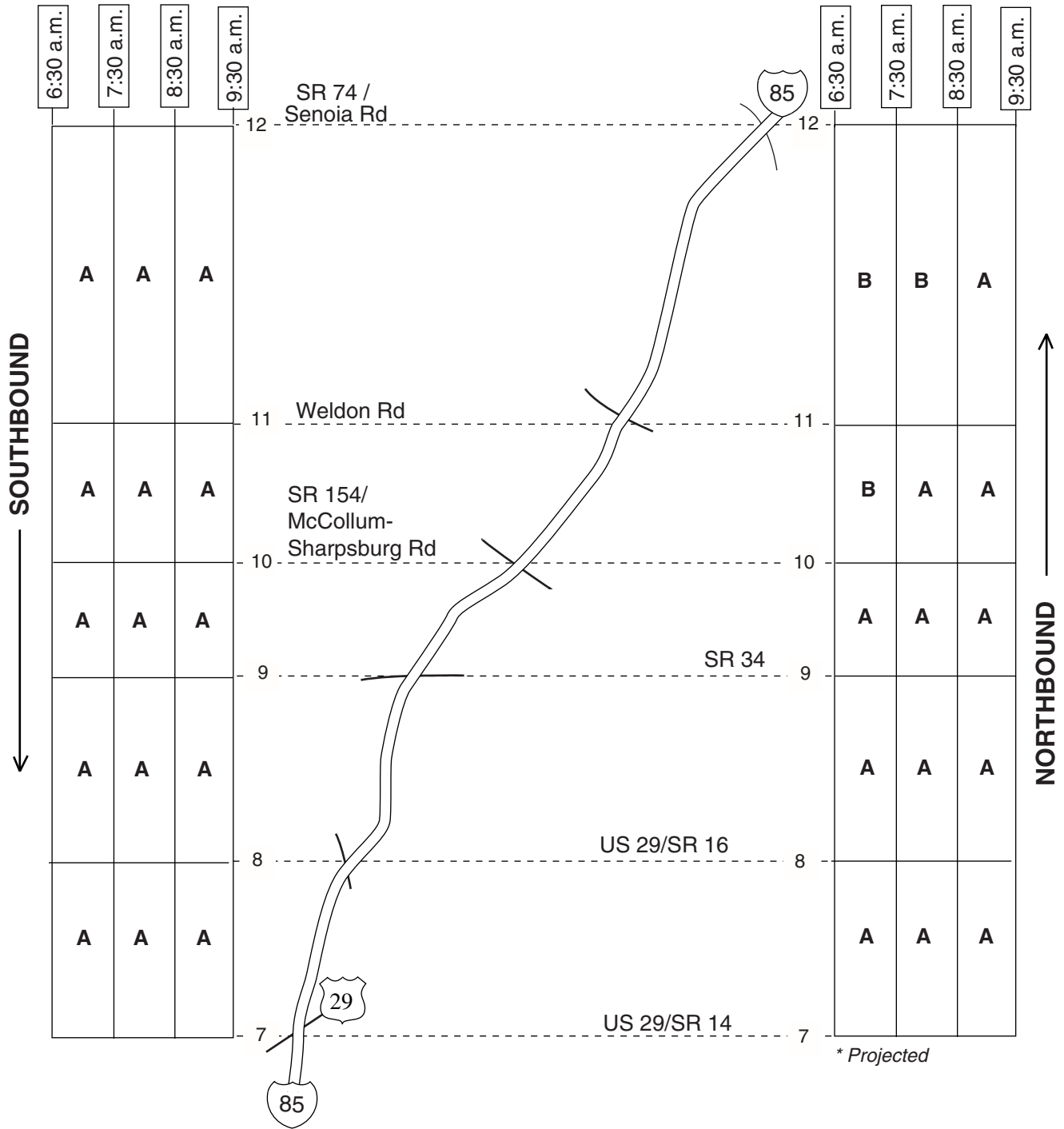
US 29/SR 14



SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

I-85 (Between SR 74 & US 29) MORNING (FALL 1998)



* Projected

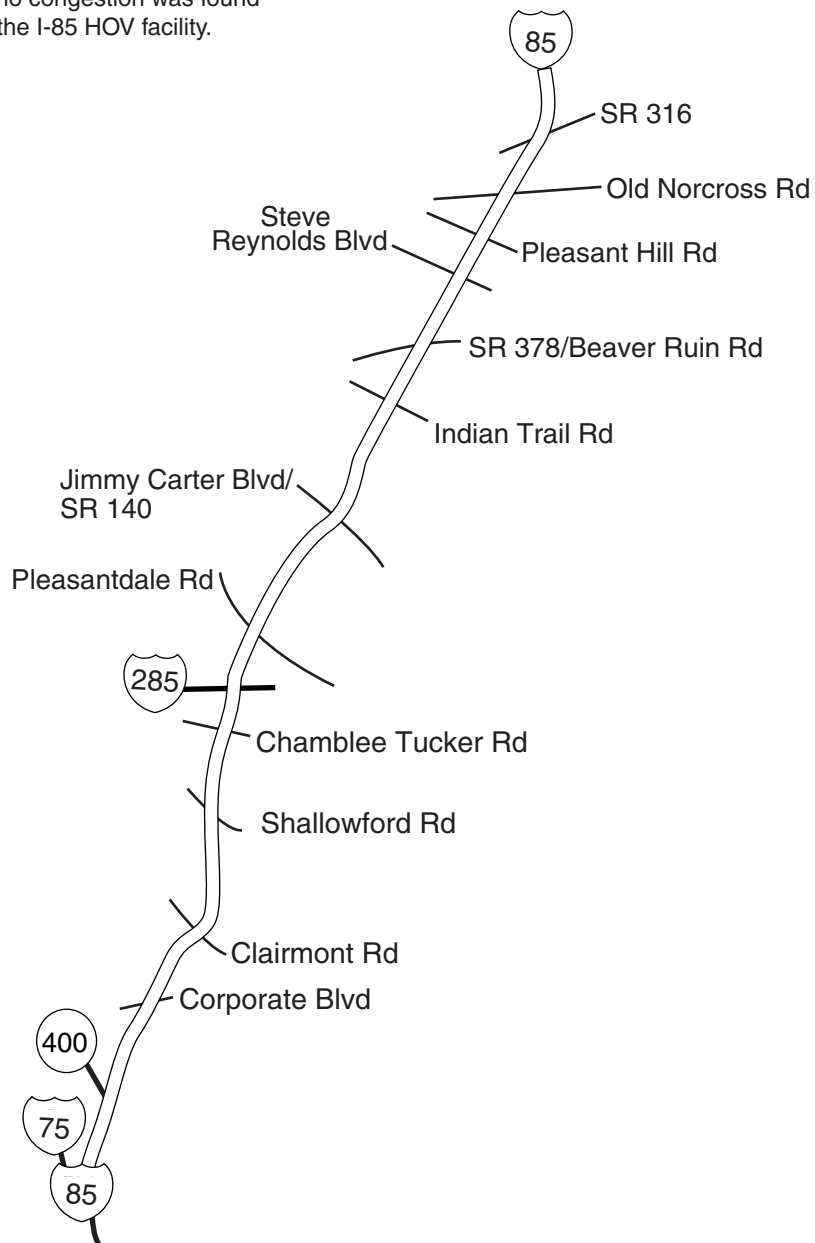
LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									





I-85 HOV MORNING (FALL 2001)

During the morning survey period, no congestion was found on the I-85 HOV facility.

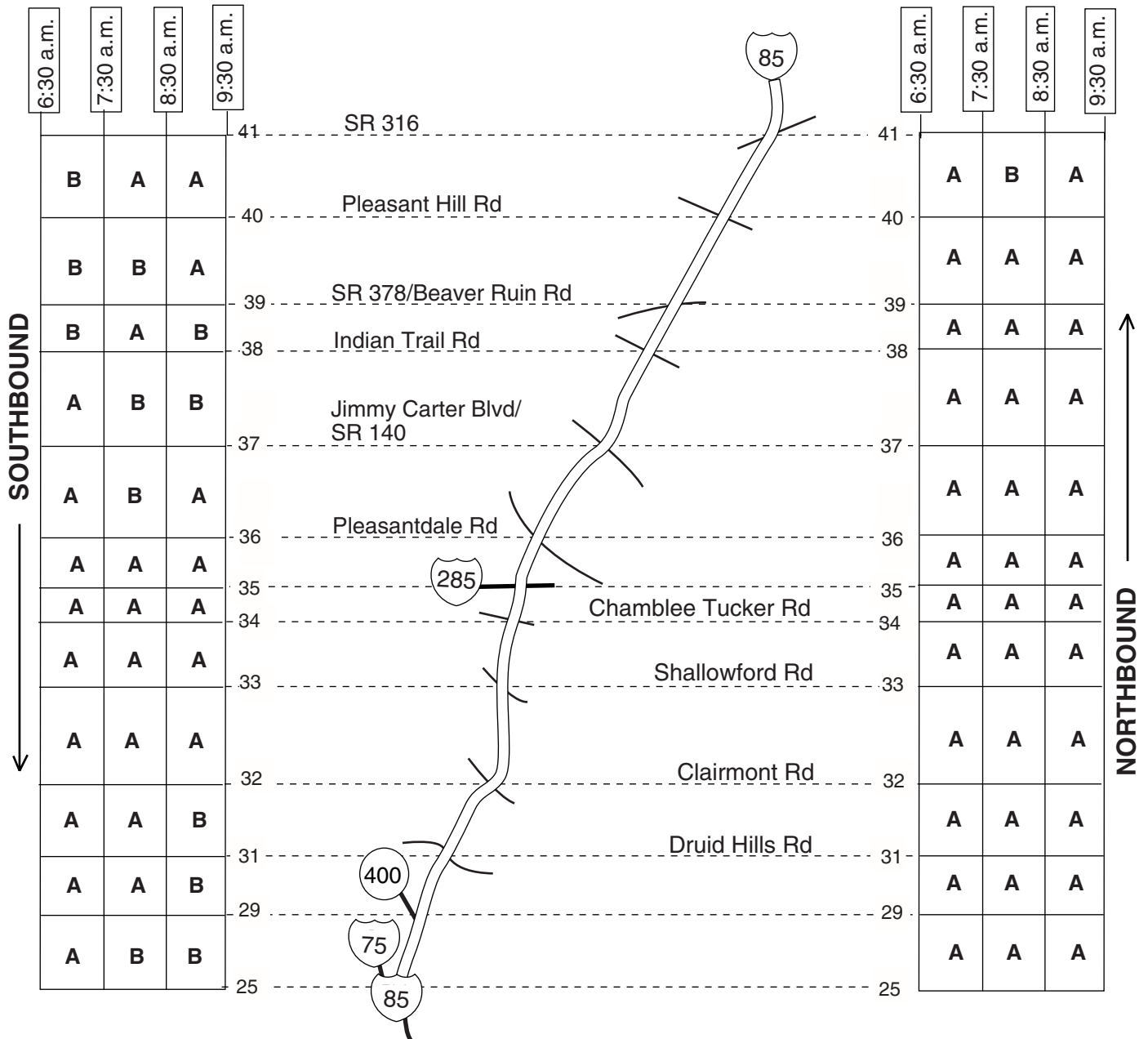


FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

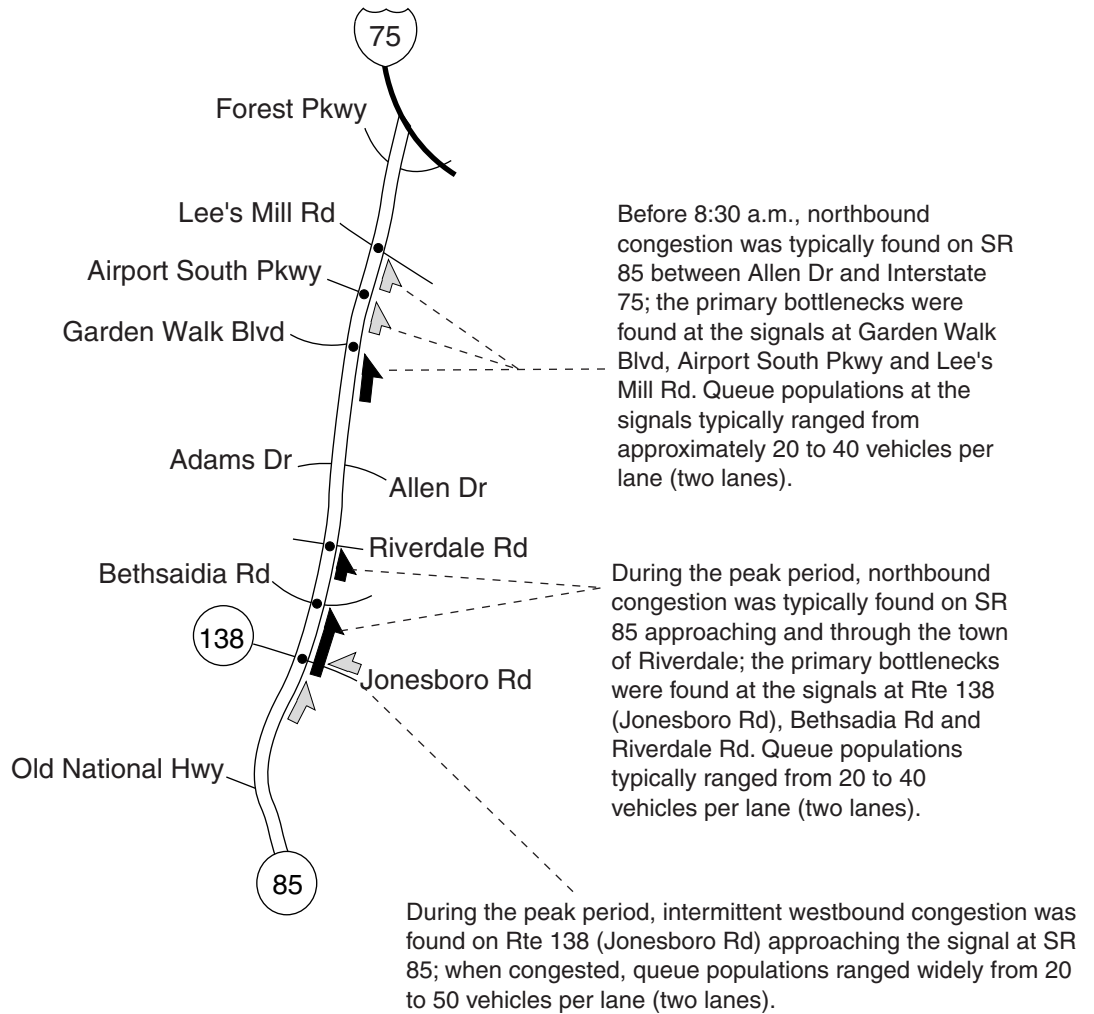


I-85 HOV MORNING (FALL 2001)





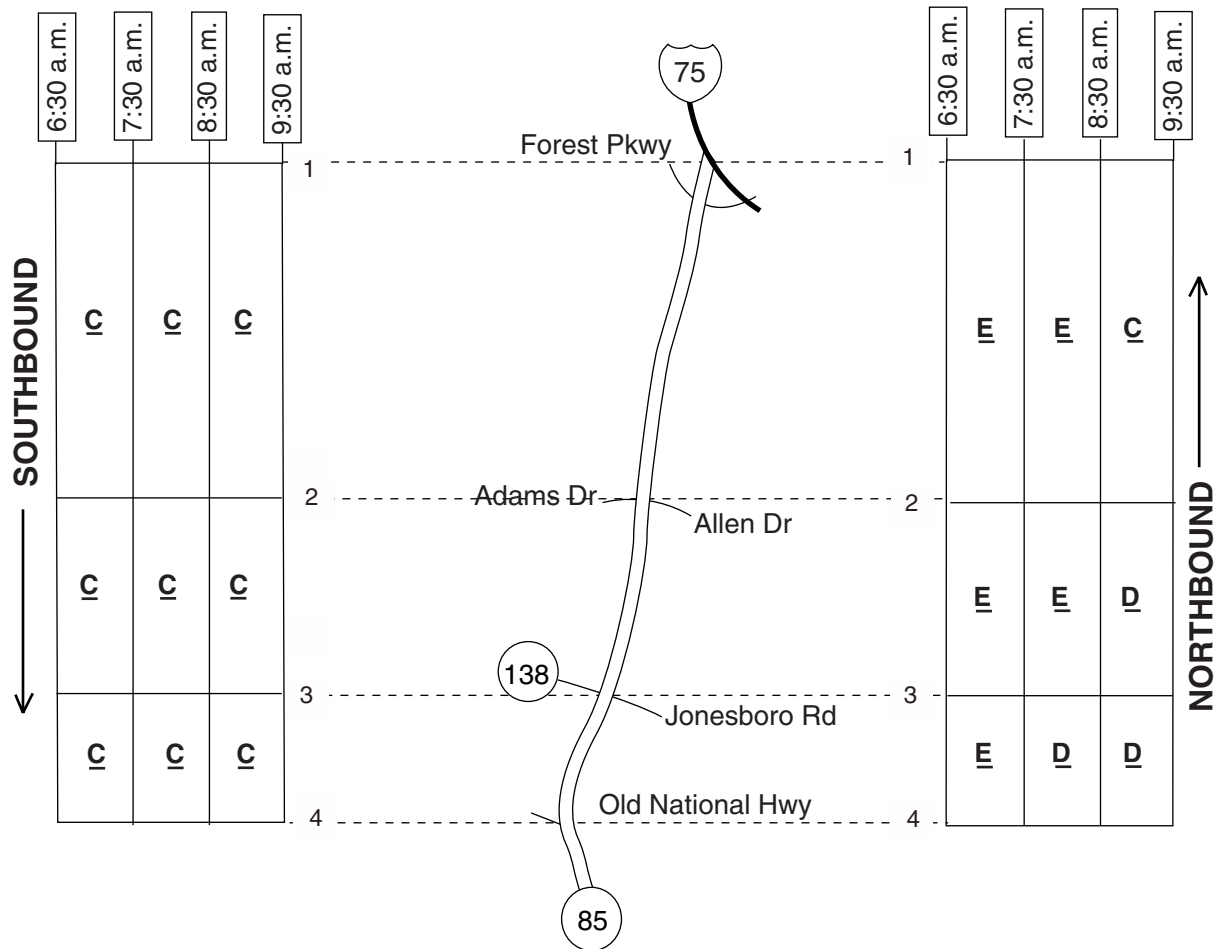
**SR 85
(Clayton County)
MORNING (FALL 2001)**



SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)

**SR 85
(Clayton County)
MORNING (FALL 2001)**



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F



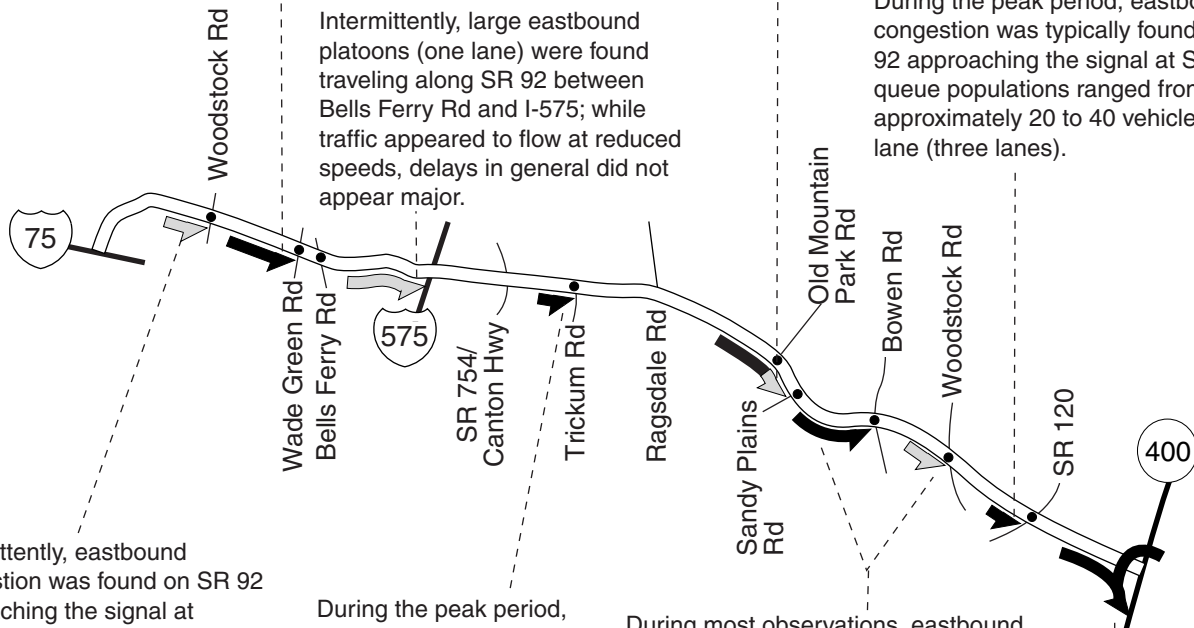
SR 92 (CROSSVILLE / WOODSTOCK /ALABAMA RD) (Cherokee / Fulton Co.) MORNING (FALL 2001)

During most observations, eastbound congestion was found on SR 92 approaching the signal at Wade Green Rd; during the peak period, queue populations sometimes exceeded 100 vehicles (one lane). East of Wade Green Rd, intermittent congestion was found approaching the signal at Bells Ferry.

During the peak period, eastbound congestion was typically found on SR 92 approaching the pair of signals at Old Mountain Park Rd and Sandy Plains Rd; queue populations ranged from approximately 20 to 40 vehicles per lane (two lanes).

During the peak period, eastbound congestion was typically found on SR 92 approaching the signal at SR 120; queue populations ranged from approximately 20 to 40 vehicles per lane (three lanes).

Intermittently, large eastbound platoons (one lane) were found traveling along SR 92 between Bells Ferry Rd and I-575; while traffic appeared to flow at reduced speeds, delays in general did not appear major.



Intermittently, eastbound congestion was found on SR 92 approaching the signal at Woodstock Rd; when congested, queue populations ranged from approximately 20 to 25 vehicles (one lane).

During the peak period, eastbound congestion was typically found on SR 92 approaching the signal at Trickum Rd; queue populations ranged from approximately 20 to 40 vehicles per lane (two lanes).

During most observations, eastbound congestion was found on SR 92 approaching the signal at Bowen Rd; during the peak period, congestion typically extended all the way back to the vicinity of Sandy Plains Rd (a distance of approximately one mile).

East of Bowen Rd, intermittent congestion was found on SR 92 approaching the signal at Woodstock Rd; when congested, queue populations ranged from approximately 20 to 40 vehicles per lane (two lanes).

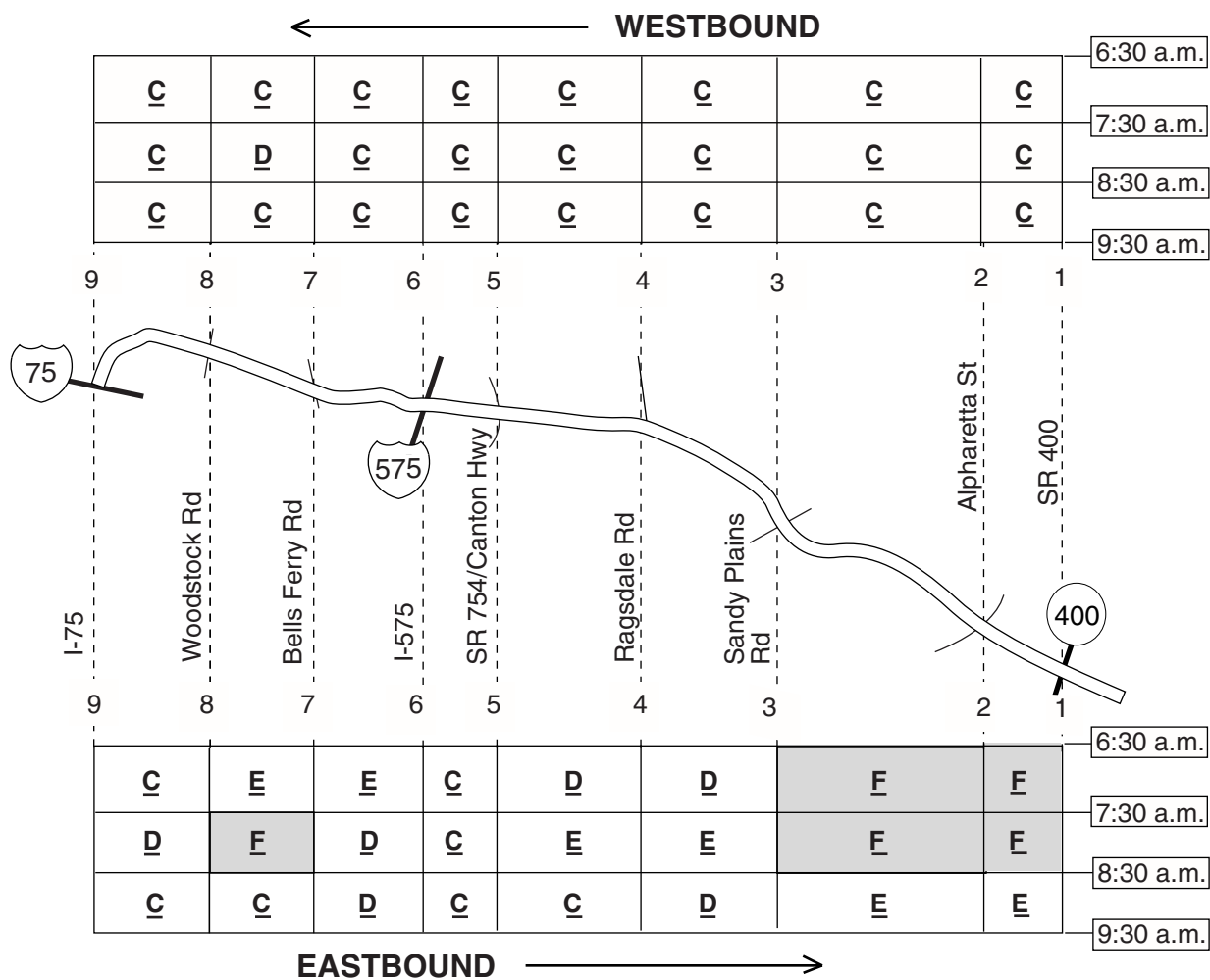
During most observations, eastbound congestion was found on SR 92 approaching the I-85 Interchange; the head of the queue was found on the southbound entrance ramp at I-85. During the peak period, a mostly continuous queue extended back through several upstream signals to the vicinity of SR 120 (a distance of approximately 1.5 miles).

SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)



**SR 92 (CROSSVILLE / WOODSTOCK /ALABAMA RD)
(Cherokee / Fulton Co.)
MORNING (FALL 2001)**

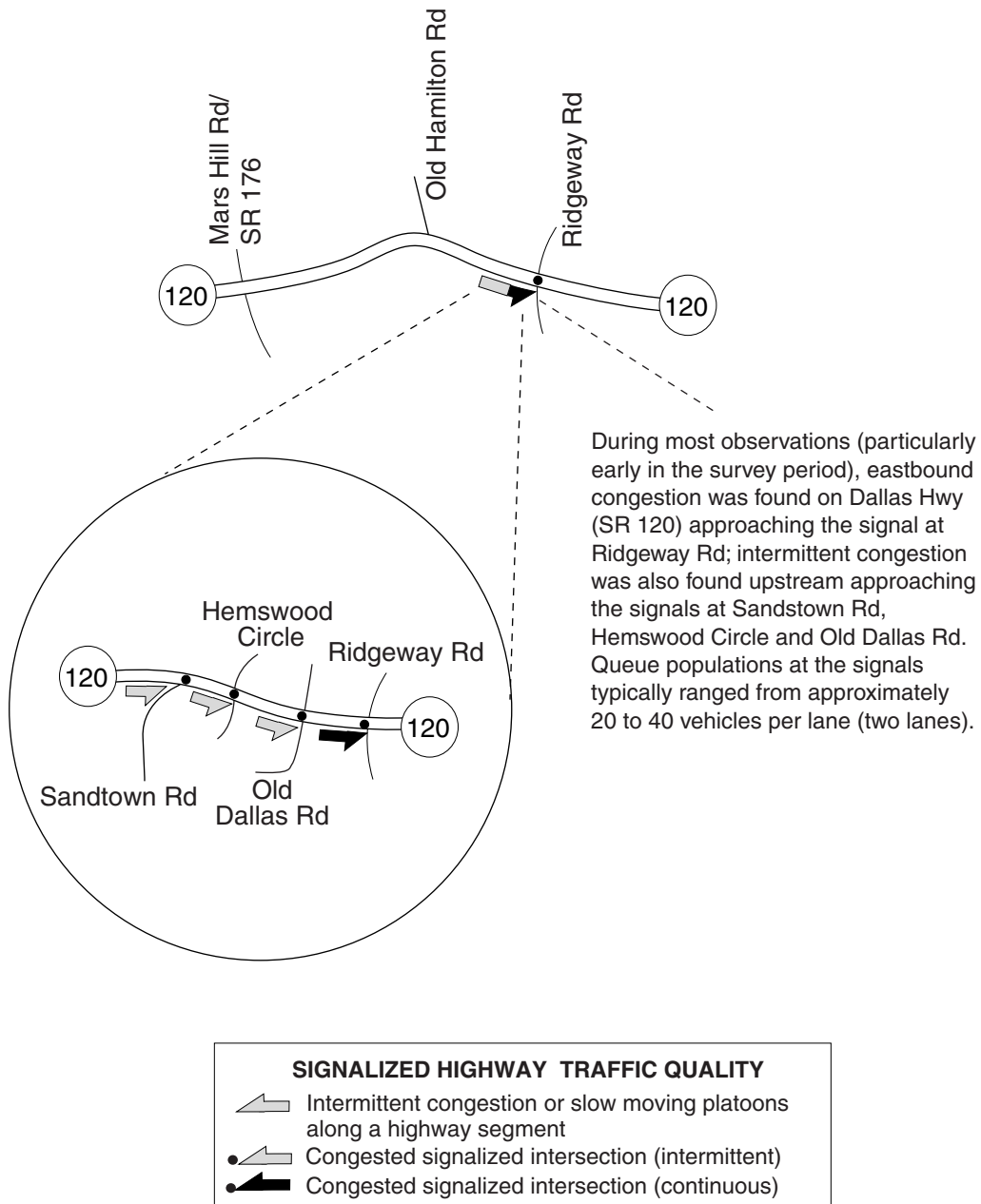


SURROGATE LEVEL-OF-SERVICE LEGEND:

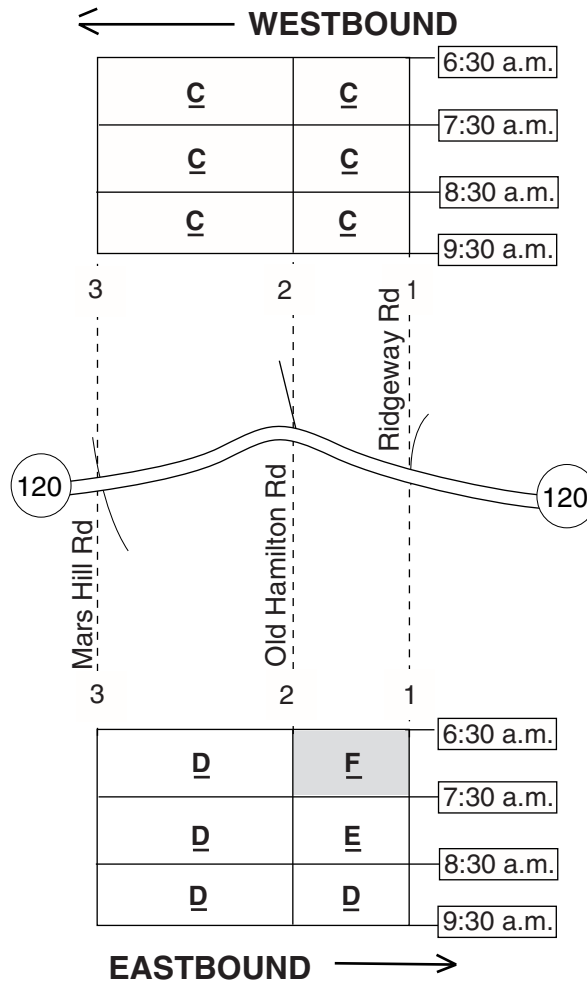
LIGHT		MODERATE		HEAVY		CONGESTED
A	B	C	D	E	F	F



**DALLAS HWY (SR 120)
(Cobb County)
MORNING (FALL 2001)**



**DALLAS HWY (SR 120)
(COBB COUNTY)
MORNING (FALL 2001)**



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F

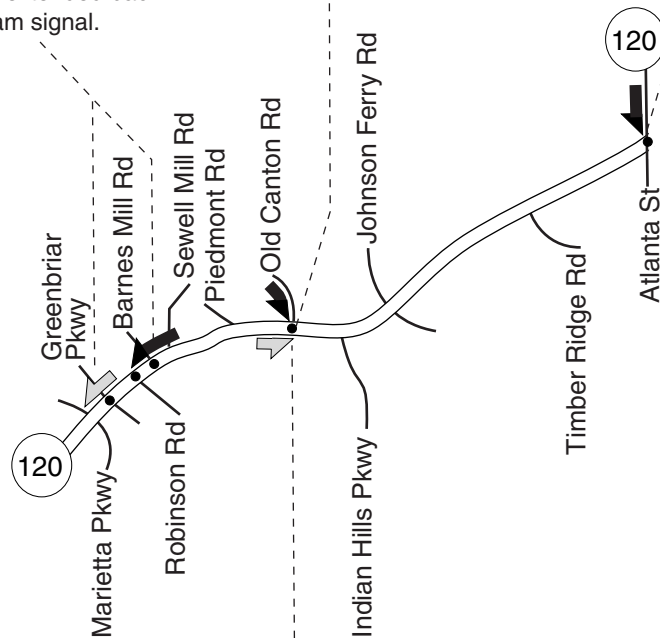


ROSWELL RD / MARIETTA HWY (SR 120) (Cobb County) MORNING (FALL 2001)

Before 8:30 a.m., westbound congestion was typically found on Roswell Rd approaching the Interchange at Marietta Pkwy; the primary bottlenecks were found at the series of signals between Piedmont Rd and Marietta Pkwy (Sewell Rd, Barnes Mill Rd, Robinson Rd and Greenbriar Pkwy). During the peak period, congestion at one signal often extended back through an upstream signal.

During most observations, southbound congestion was found on Old Canton Rd approaching the signal at Roswell Rd; queue population ranged widely, from 20 to 50 vehicles (one lane). In some cases, congestion extended back through the upstream signal at Sewell Mill Rd.

During most observations, southbound congestion was found on Rte 9 approaching the signal at Marietta Hwy (SR 120); queue populations typically ranged from approximately 20 to 80 vehicles per lane (two lanes).

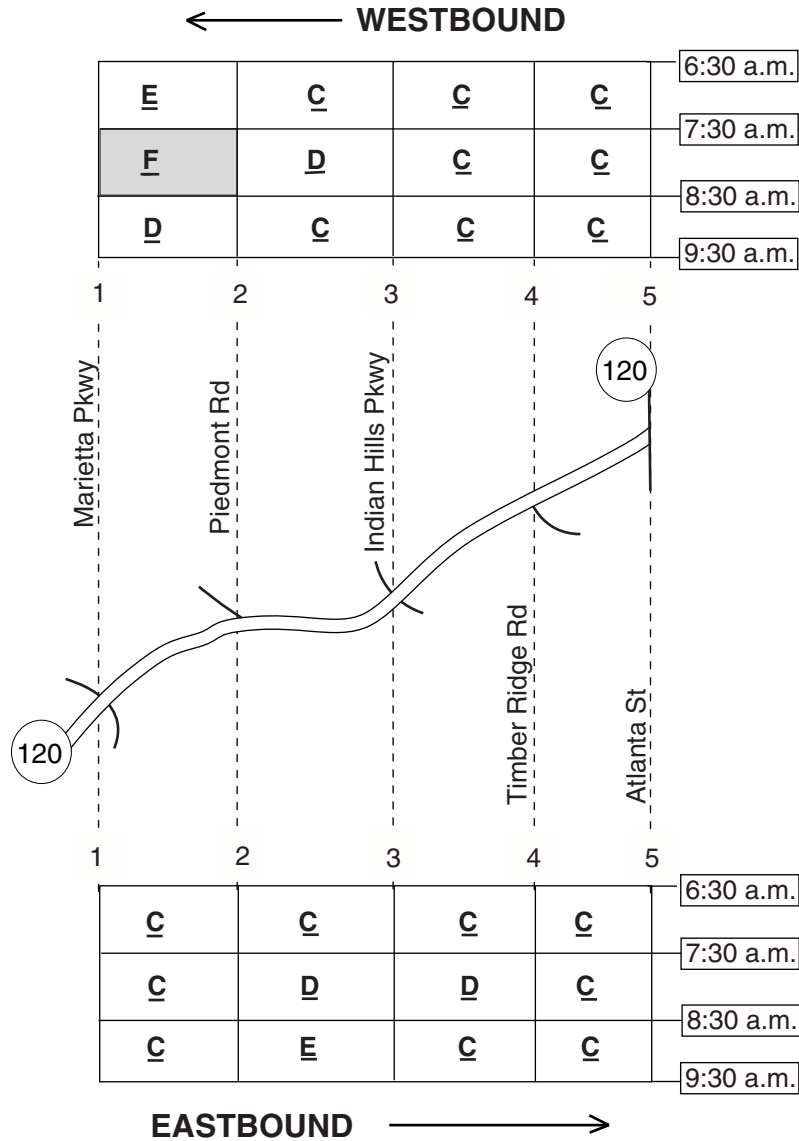


Intermittently, eastbound congestion was found on Roswell Rd approaching the signal at Old Canton Rd; when congested, queue populations ranged from approximately 20 to 30 vehicles per lane (two lanes).

SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)

ROSWELL RD / MARIETTA HWY (SR 120)
(Cobb County)
MORNING (FALL 2001)



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>



SR 120 / STATE BRIDGE / PLEASANT HILL RD (Fulton / Gwinnett Co.) MORNING (FALL 2001)

During most observations, eastbound congestion was found on SR 120 approaching the signals at Mansell Rd and Hembree Rd; queue populations typically ranged from approximately 20 to 40 vehicles per lane (two lanes).

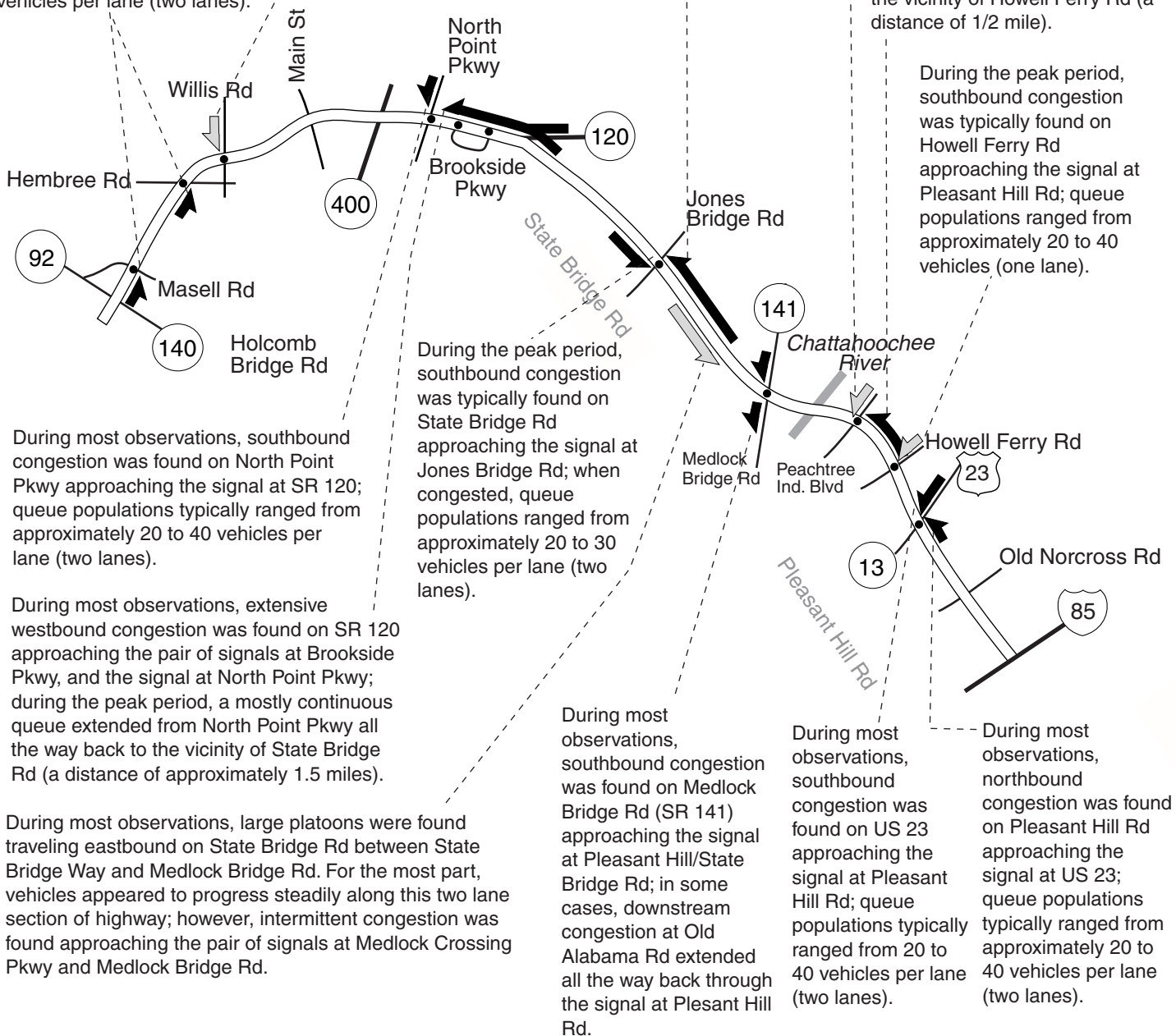
Intermittently, southbound congestion was found on Willis Rd approaching the signal at SR 120; when congested, queue populations ranged from approximately 20 to 40 vehicles (one lane).

During most observations, extensive northbound congestion was typically found on State Bridge Rd approaching the signal at Jones Bridge Rd; the single lane queue often extended upstream for over one mile.

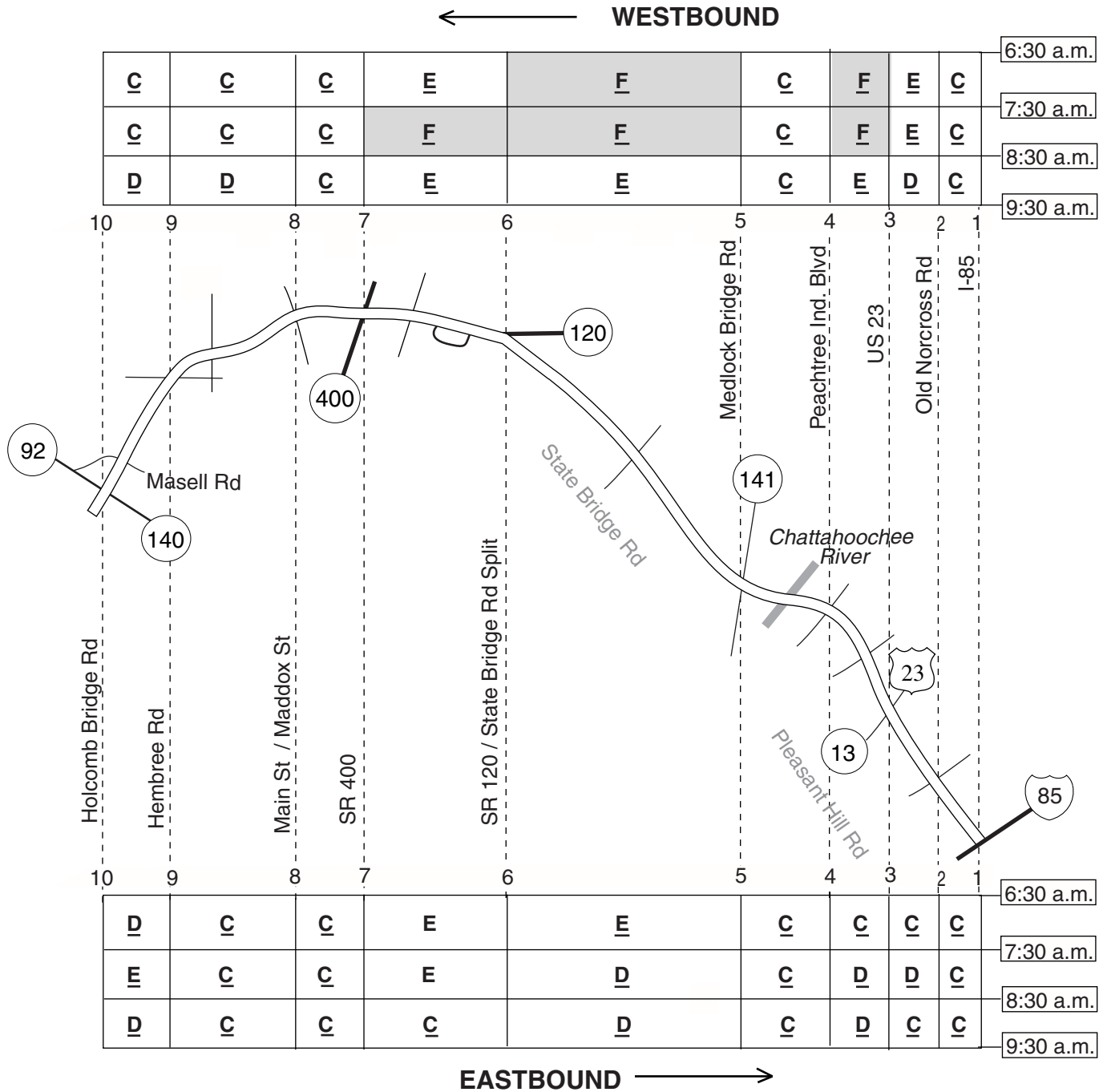
Intermittently, southbound congestion was found on Peachtree Industrial Blvd approaching the signal at Pleasant Hill Rd; when congested, queue populations ranged from approximately 20 to 30 vehicles per lane (three lanes).

During most observations, northbound congestion was found on Pleasant Hill Rd approaching the signal at Peachtree Industrial Blvd; during the peak period, congestion often extended back to the vicinity of Howell Ferry Rd (a distance of 1/2 mile).

During the peak period, southbound congestion was typically found on Howell Ferry Rd approaching the signal at Pleasant Hill Rd; queue populations ranged from approximately 20 to 40 vehicles (one lane).



SR 120 / STATE BRIDGE / PLEASANT HILL RD
(Fulton / Gwinnett Co.)
MORNING (FALL 2001)

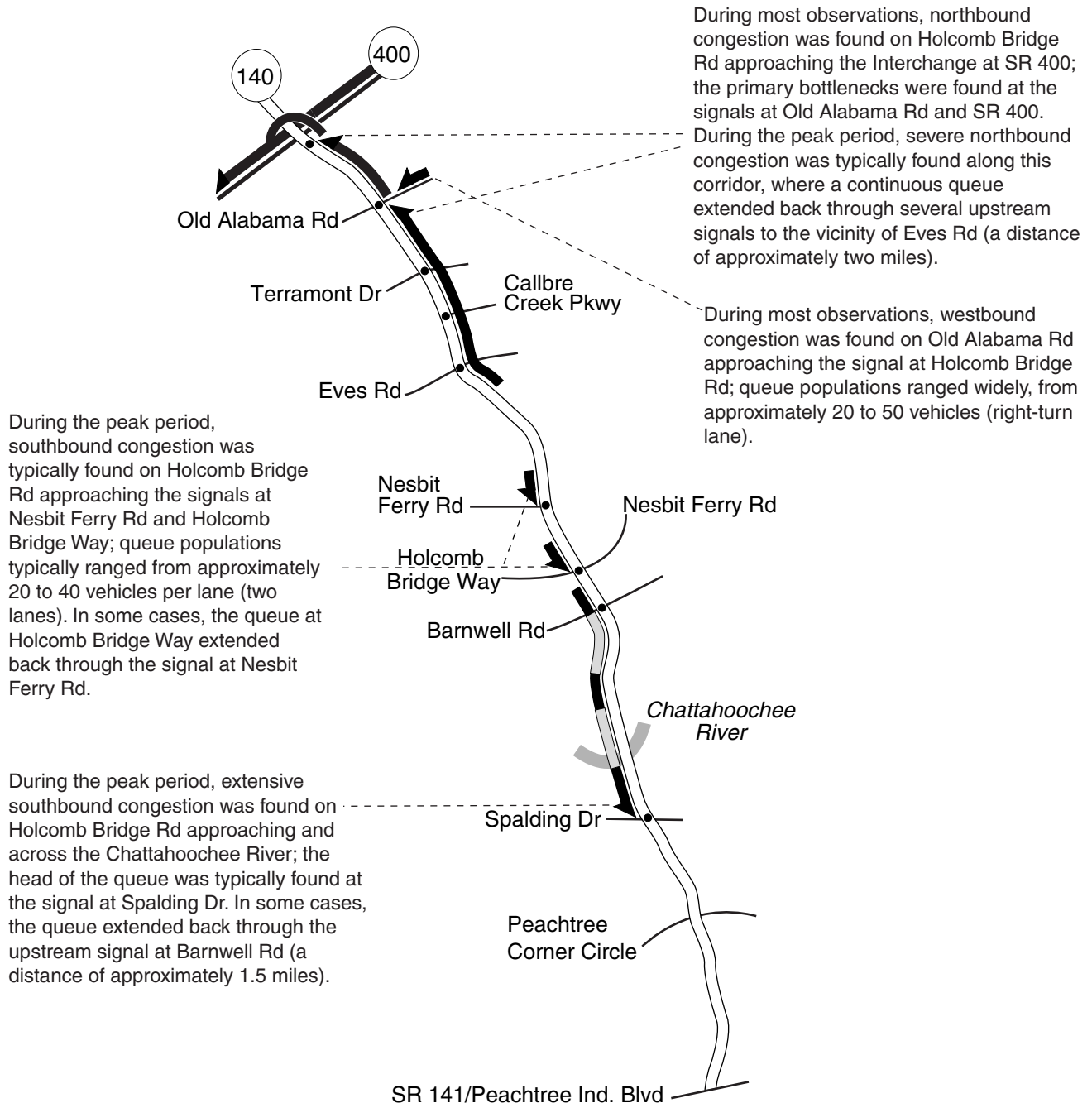


SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F



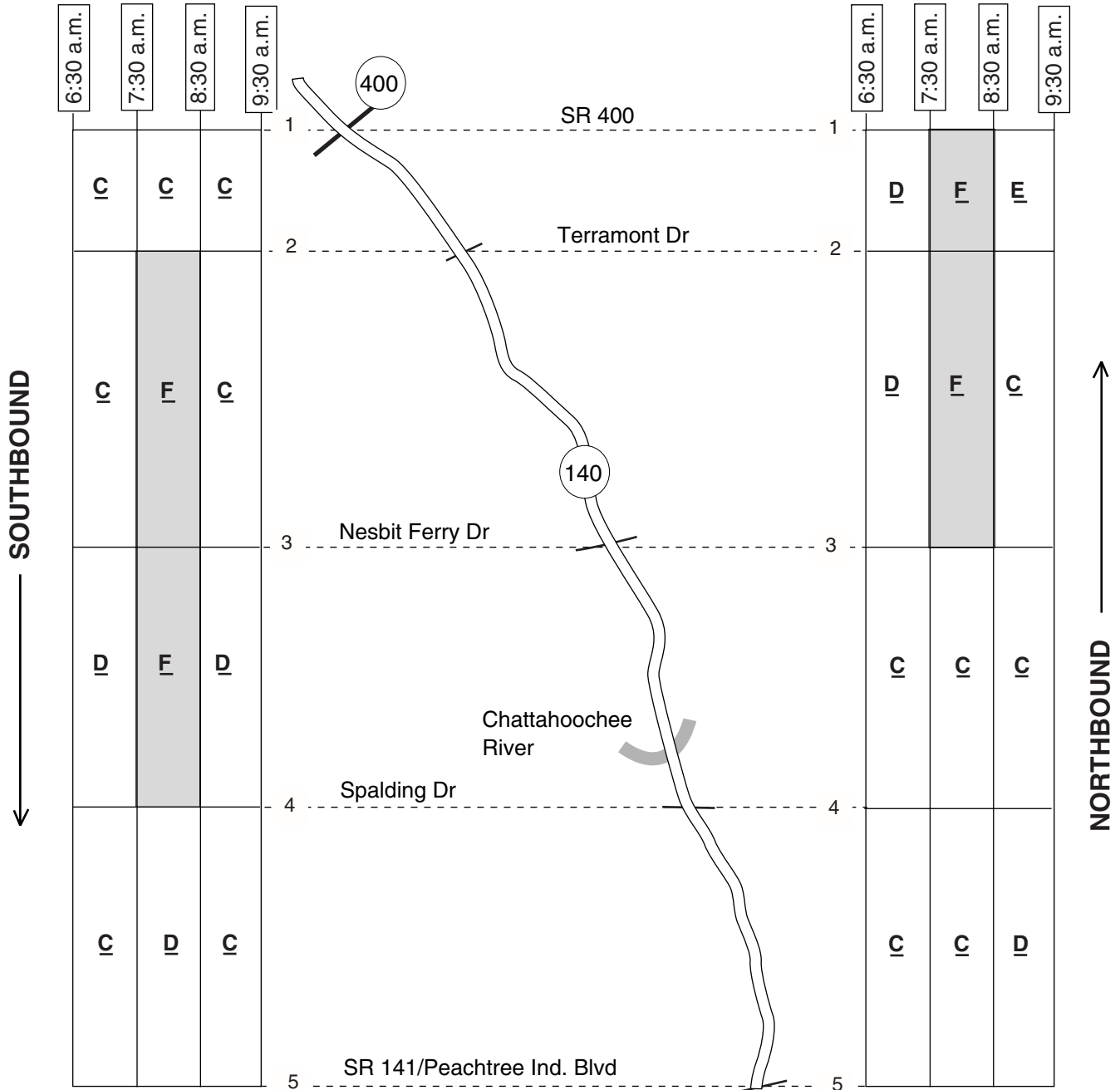
HOLCOMB BRIDGE RD (SR 140) **(Gwinnett / Fulton Co.)** **MORNING (FALL 2001)**



SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)

HOLCOMB BRIDGE RD (SR 140) **(Gwinnett / Fulton Co.)** **MORNING (FALL 2001)**



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F



SR 141 (Peachtree Industrial Blvd / Peachtree Pkwy / Medlock Bridge Rd) **(Fulton / Gwinnett / Dekalb Co.)** **MORNING (FALL 2001)**

During the morning survey period, southbound travelers on SR 141 incurred extensive delays approaching and across the Chattahoochee River. North of the river, the primary bottlenecks were found at signals at State Bridge Rd and Old Alabama Rd; during the peak period, congestion at Old Alabama Rd typically extended back through the signal at State Bridge Rd, for a total queue length of approximately 1.5 miles.

South of the river, the primary bottlenecks were found at the signals at Jones Bridge Rd and Peachtree Corners Circle; during the peak period, a mostly continuous queue extended back to the vicinity of the Chattahoochee River (a distance of approximately 1.5 miles).

South of Peachtree Corners Circle, large southbound platoons were typically found on the approach to the freeway section at Jimmy Carter Blvd; while some delays were apparent, no one signal appeared to generate consistent congestion.

During most observations, westbound congestion was found on Abbotts Bridge Rd approaching the signal at SR 141; queue populations typically ranged from 20 to 35 vehicles (one lane).

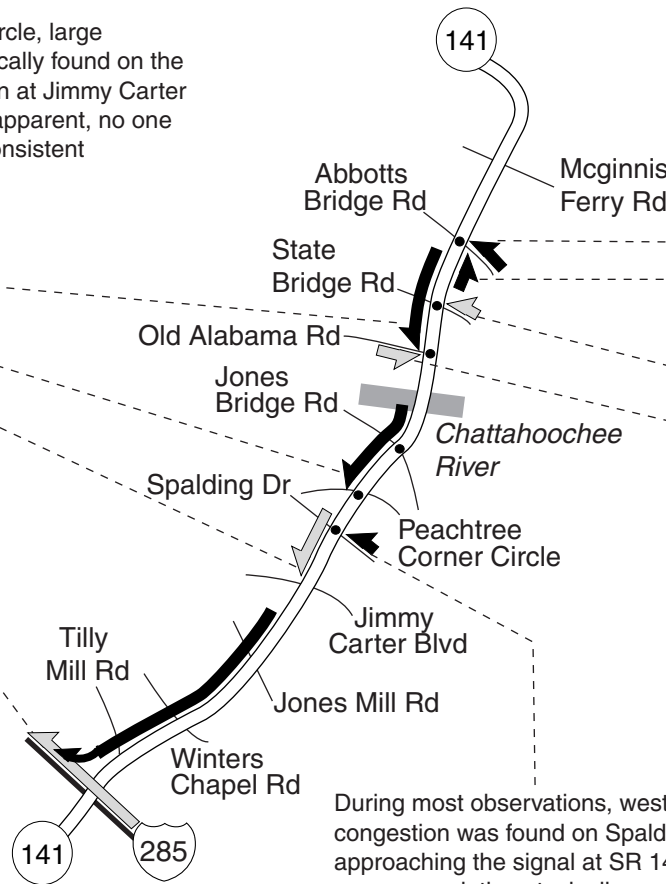
During the peak period, northbound congestion was typically found on SR 141 approaching the signal at Abbotts Bridge Rd; queue populations ranged from approximately 20 to 30 vehicles per lane (two lanes).

Intermittently, westbound congestion was found on State Bridge Rd approaching the signal at SR 141; when congested, queue populations ranged from approximately 20 to 30 vehicles per lane (two thru-lanes).

During the peak period, eastbound congestion was typically found on Old Alabama Rd approaching the signal at SR 141; when congested, queue populations ranged from approximately 20 to 30 vehicles (left-turn lane).

During most observations after 7:30 a.m., an extended zone of southbound congestion was found on SR 141 approaching the Perimeter; average estimated speeds typically ranged from approximately 25 to 45 mph. The head of the queue was found on the northbound ramp to the Perimeter.

During most observations, westbound congestion was found on Spalding Dr approaching the signal at SR 141; queue populations typically ranged from 20 to 40 vehicles (one thru-lane).



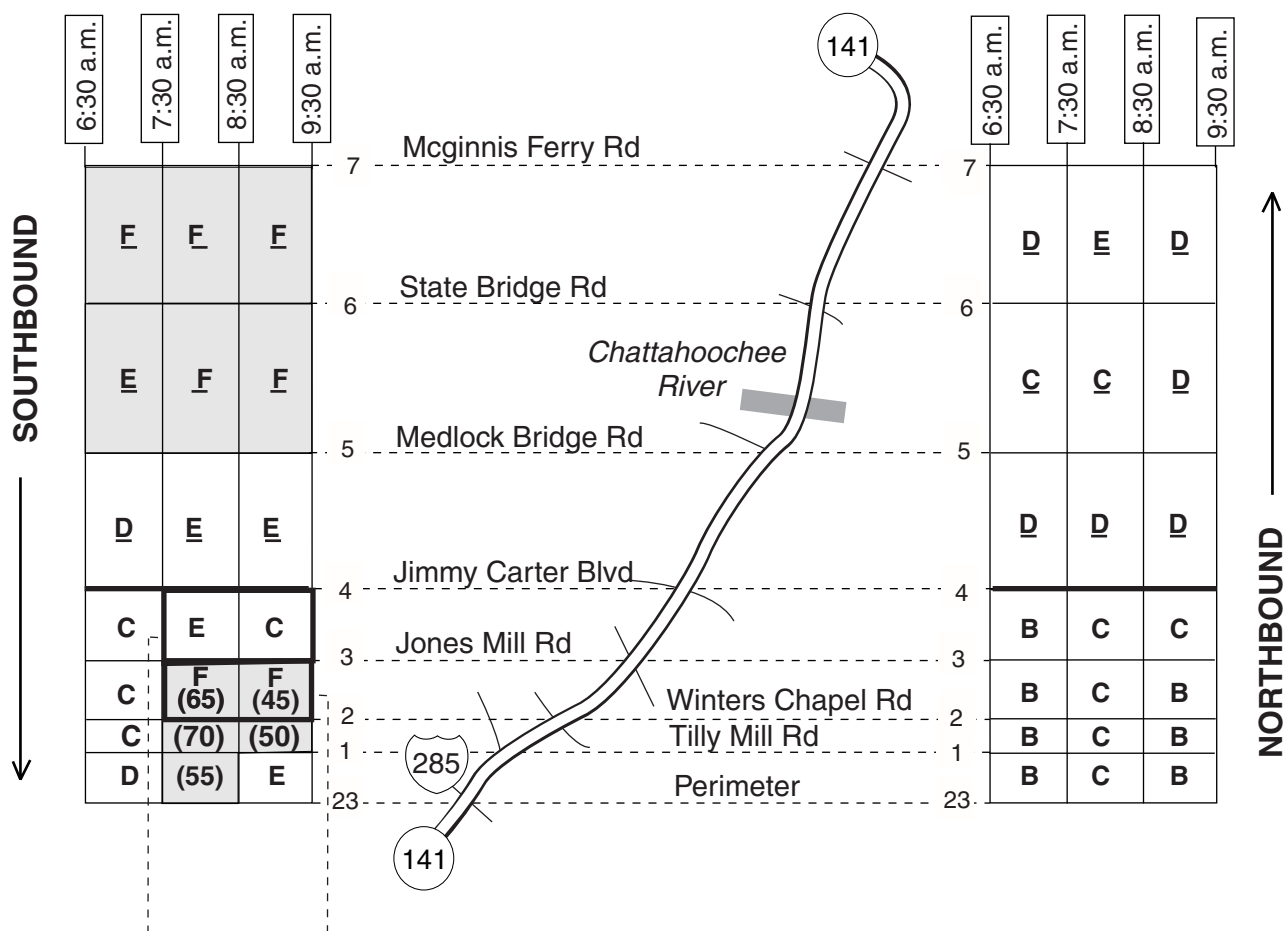
SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)

FREEWAY TRAFFIC QUALITY

- Congested flow (Estimated average speed 30-50 mph)
- Congested flow (Estimated average speed < 30 mph)

SR 141 (Peachtree Industrial Blvd / Peachtree Pkwy / Medlock Bridge Rd)
(Fulton / Gwinnett / Dekalb Co.)
MORNING (FALL 2001)



On one day only, congestion extended back into this segment; densities ranged between 65 and 55 pcplpm with corresponding speed estimates of 30 to 35 mph.

These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 85 and 75 pcplpm with corresponding speed estimates of 20 to 25 mph.

LEVEL-OF-SERVICE LEGEND:

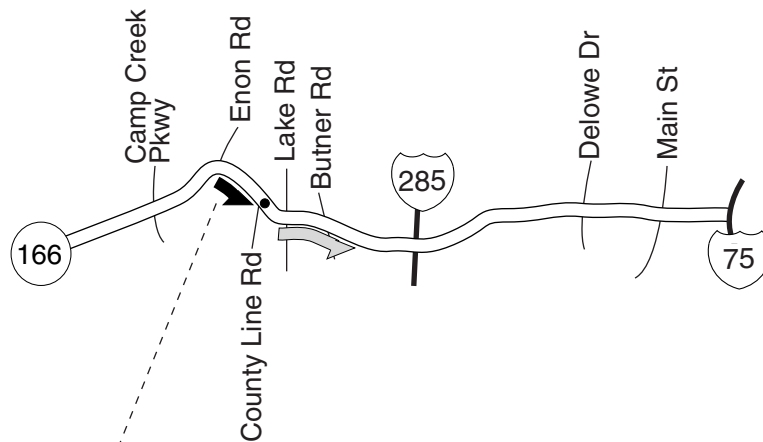
LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F			
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									

SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED	
A	B	C	D	E	F		



CAMPBELLTON RD / LAKEWOOD FWY (SR 166) **(Fulton County)** **MORNING (FALL 2001)**



During the peak period (7:00-8:30 a.m.), eastbound congestion was found SR 166 approaching the signal at County Line Rd; queue populations typically ranged from approximately 20 to 30 vehicles (one lane). East of County Line Rd, large platoons appeared to progress steadily on the approach to the Perimeter Interchange.

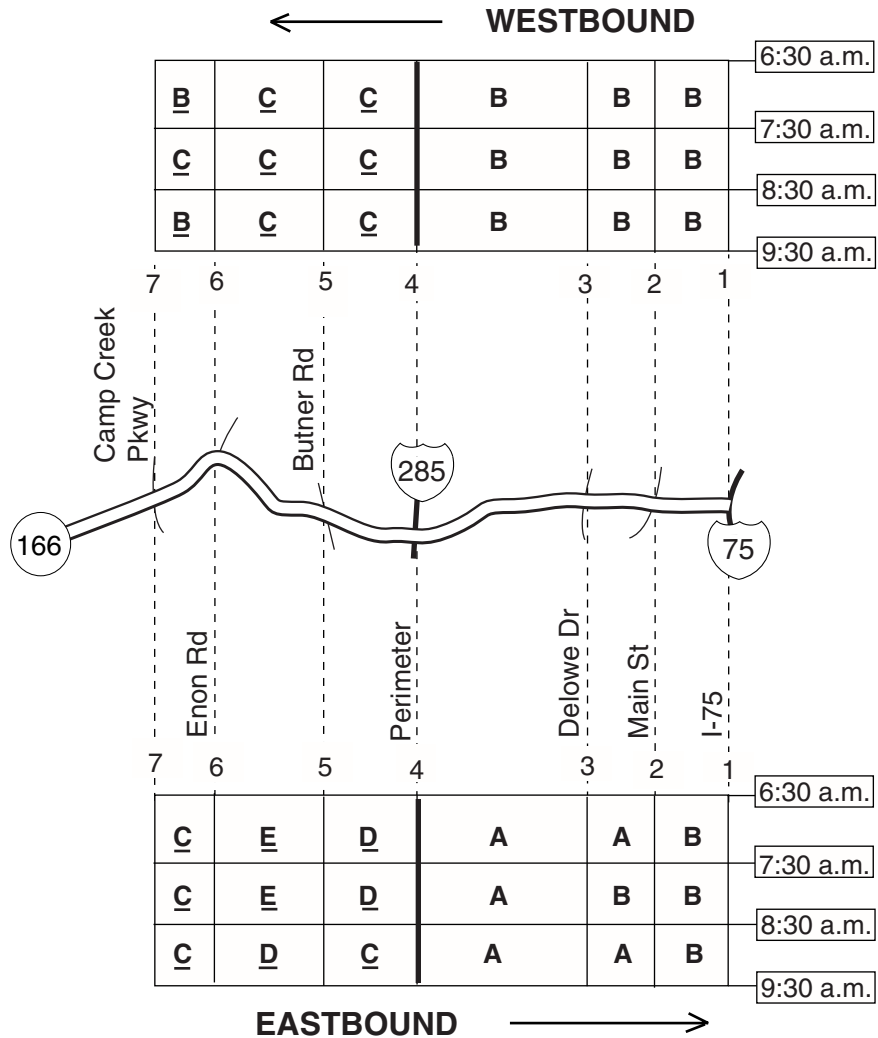
SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)

FREEWAY TRAFFIC QUALITY

- Congested flow (Estimated average speed 30-50 mph)
- Congested flow (Estimated average speed < 30 mph)

**CAMPBELLTON RD / LAKEWOOD FWY (SR 166)
(Fulton County)
MORNING (FALL 2001)**



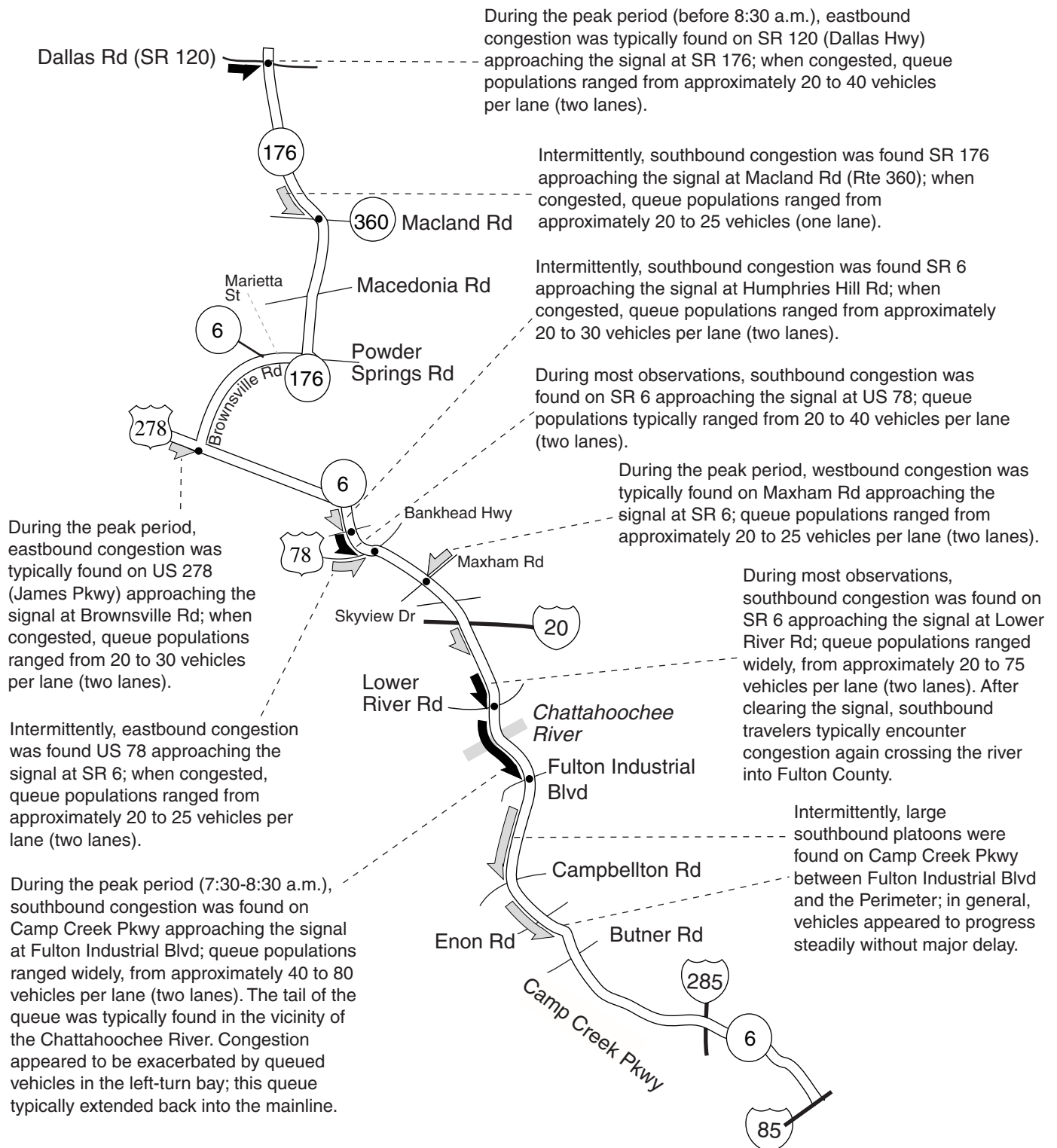
SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F

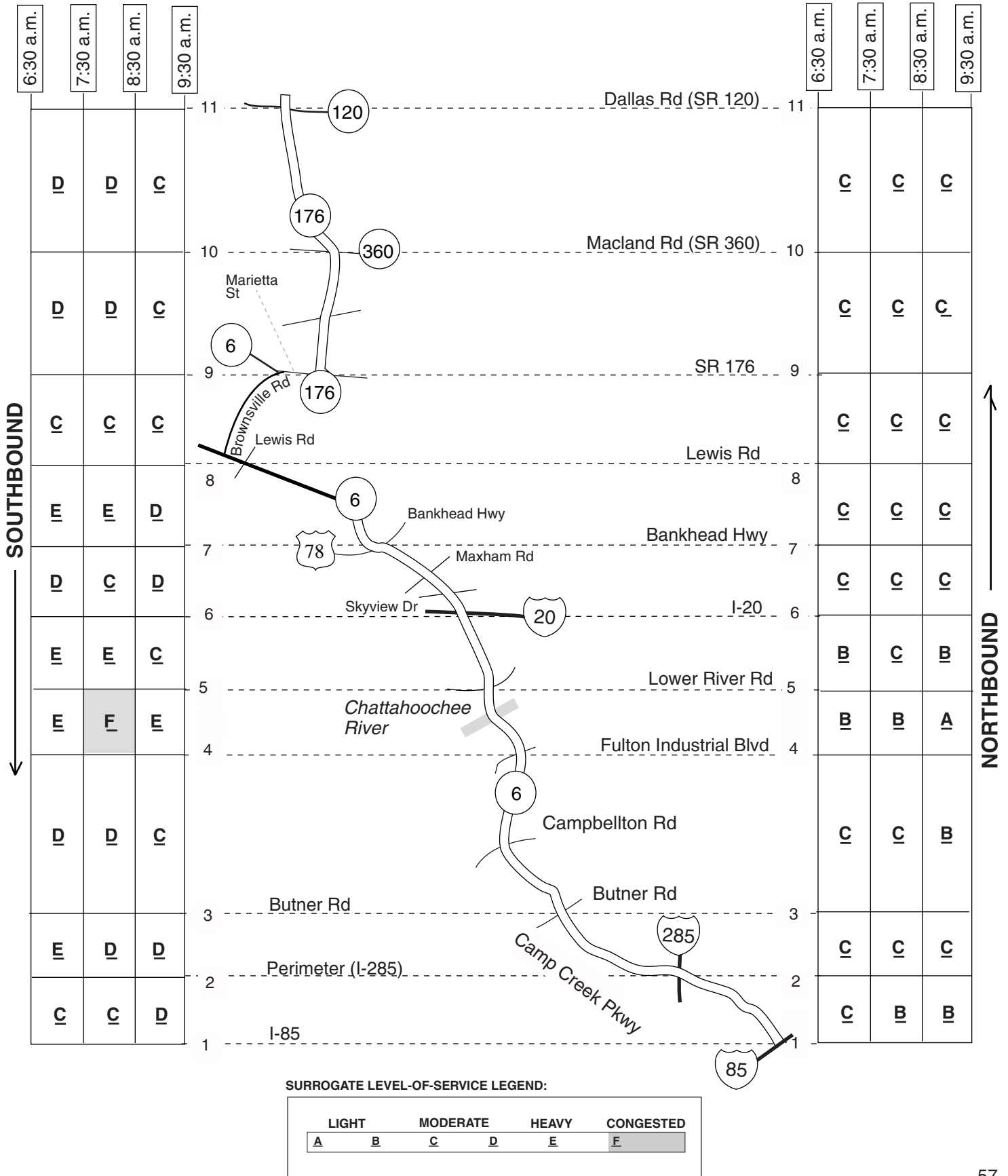
LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED	SEVERE
A	B	C	D	E	F	F	F
0	10	20	30	45	65		
Density scale (cars per lane-mile)							
Note: F (60) in the tables means level-of-service "F", with density = 60							

SR 176 / BROWNSVILLE RD / SR 6 / CAMP CREEK PKWY **(Cobb / Douglas / Fulton Co.)** **MORNING (FALL 2001)**



SR 176 / SR 6 / CAMP CREEK PKWY
(Cobb / Douglas / Fulton Co.)
MORNING (FALL 2001)



PERIMETER (I-285)

MORNING (FALL 2001)

A:

During the peak period, eastbound congestion was found on the Perimeter between I-75 and the vicinity of Northside Dr; average estimated speeds ranged from approximately 20 to 30 mph. The primary bottleneck was the lane drop (6 lanes to 5) at Northside Ave. East of Northside Ave, traffic flow typically improved.

B:

During the peak period, westbound congestion was found on the Perimeter between I-85 and the vicinity of SR 400; average estimated speeds typically ranged from approximately 30 to 50 mph. Congestion appeared to be caused or exacerbated by the weaving and merging associated with the interchanges along this corridor. The head of the queue was sometimes found in the right lanes of the Perimeter approaching the SR 400 Interchange.

C:

One day only, congestion was found on the westbound exit ramp at Peachtree Rd; approximately 30 to 35 vehicles were queued at the signal at the head of the ramp (one thru-lane).

D:

Before 8:30 a.m., an extended zone of northbound congestion was found on the Perimeter between the vicinity of US 278 and Chamblee-Tucker Rd; average estimated speeds typically ranged from approximately 20 to 40 mph. The primary bottleneck was traffic entering at the closely spaced ramps at US 78 and Lawrenceville Rd.

E:

Intermittently, southbound congestion was found on Cobb Dr approaching the signal at the Perimeter; when congested, approximately 40 to 50 vehicles were queued at the signal (left-turn lane).

F:

On some days but not others, northbound congestion was found on the Perimeter between the vicinity of the Chattahoochee River and Paces Ferry Rd; when congested, average estimated speeds typically ranged from approximately 40 to 50 mph. Congestion appeared to be caused or exacerbated by ongoing construction at Paces Ferry Rd Interchange.

G:

Intermittently, congestion was found on the eastbound exit ramp at Ashford-Dunwoody Rd; when congested, approximately 40 to 45 vehicles were queued at the signal at the head of the ramp (2 left-turn lanes).

H:

Intermittently, eastbound congestion was found on Paces Ferry Rd approaching the signal at the Perimeter; when congested, approximately 20 to 25 vehicles per lane were queued at the signal (2 lanes).

I:

Intermittently, eastbound congestion was found on Atlanta Rd approaching the signal at the Perimeter; when congested, approximately 20 to 25 vehicles per lane were queued at the signal (2 lanes).

PERIOD: MORNING

CLOCKWISE DIRECTION OF TRAVEL

HEAVY CONGESTED SEVERE
D E F F
30 45 65
scale (cars per lane-mile)
means level-of-service "F", with density = 60

Inner - 6
Middle - 7
Outer - 8

Time Rings
Inner - 6:30 - 7:30 a.m.
Middle - 7:30 - 8:30 a.m.
Outer - 8:30 - 9:30 a.m.

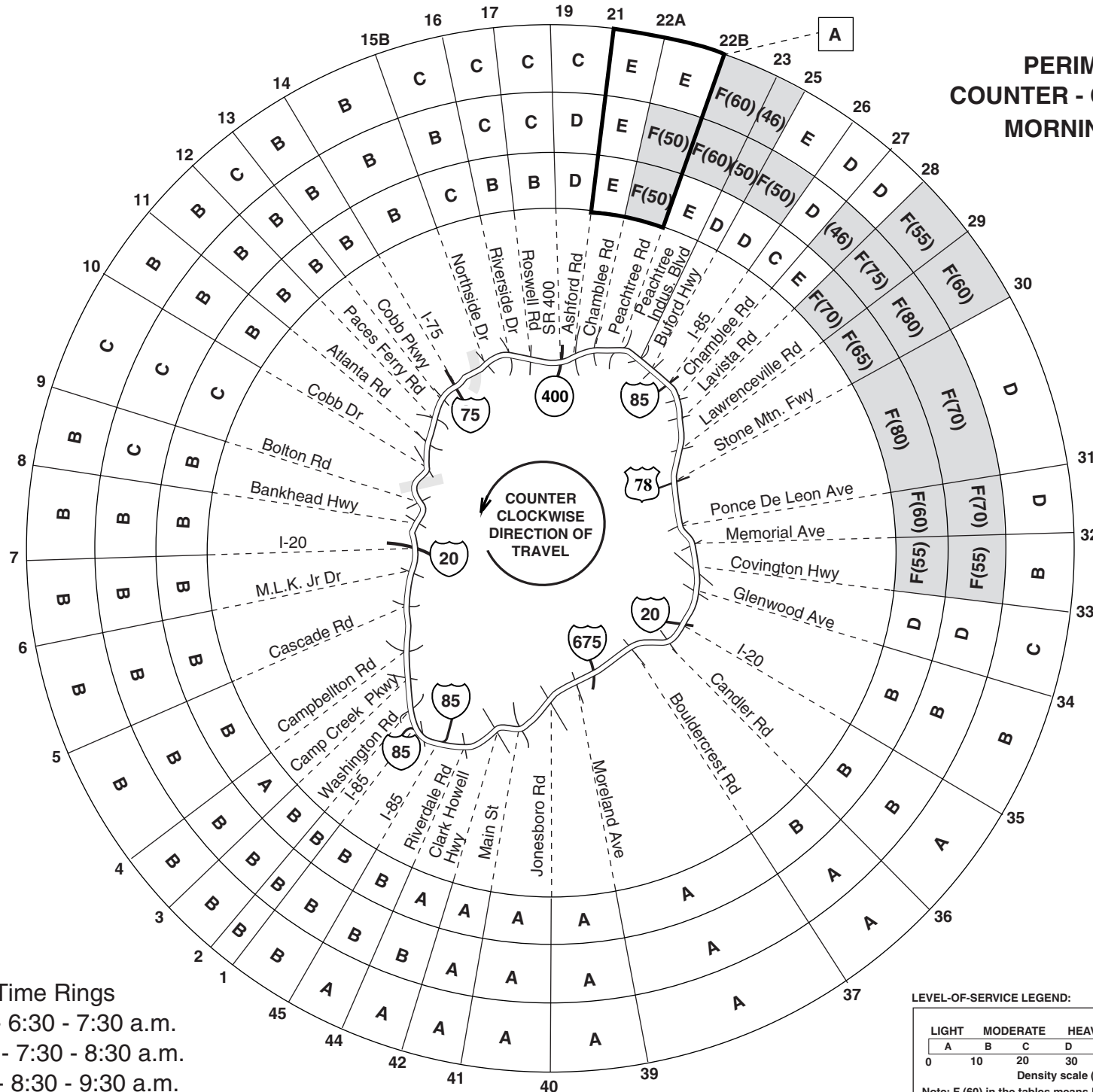
LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F				
0	10	20	30	45	65				

Density scale (cars per lane-mile)

Note: F (60) in the tables means level-of-service "F", with density = 60

PERIMETER (I-285) COUNTER - CLOCKWISE FLOW MORNING (FALL 2001)



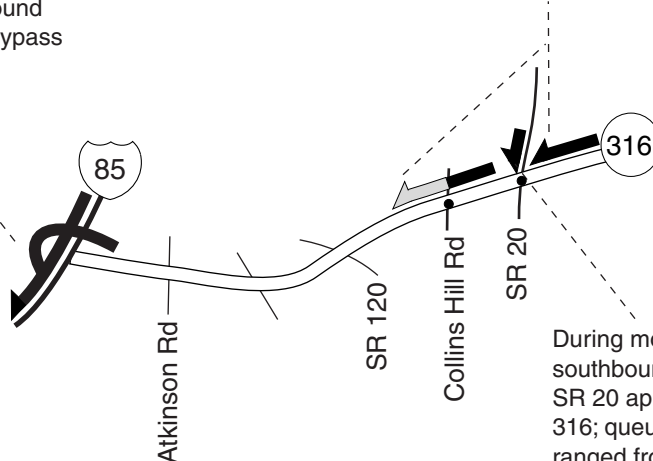
A: These level-of-service ratings represent the mathematical average of densities, which varied widely between the right- and left-hand lanes. When congested, densities in the right two lanes approaching the Perimeter typically ranged between 65 and 45 pcplpm with corresponding speed estimates of 30 to 50 mph.

**SR 316
(Gwinnett County)
MORNING (FALL 2001)**






During the peak period (before 8:00 a.m.), a short zone of westbound congestion was typically found at the terminus of SR 316; vehicles were queued in the left lanes on the approach to the I-85 southbound ramp. Traffic destined for I-85 northbound appeared to be able to bypass the queue without delay.

Throughout the morning survey period, extensive westbound congestion was found on SR 316 approaching the pair of signals at SR 20 and Collins Hill Rd; queue populations at the signals ranged widely, from approximately 30 to 60 vehicles per lane (two lanes).





During most observations, southbound congestion was found on SR 20 approaching the signal at SR 316; queue populations typically ranged from 20 to 45 vehicles per lane (two lanes).

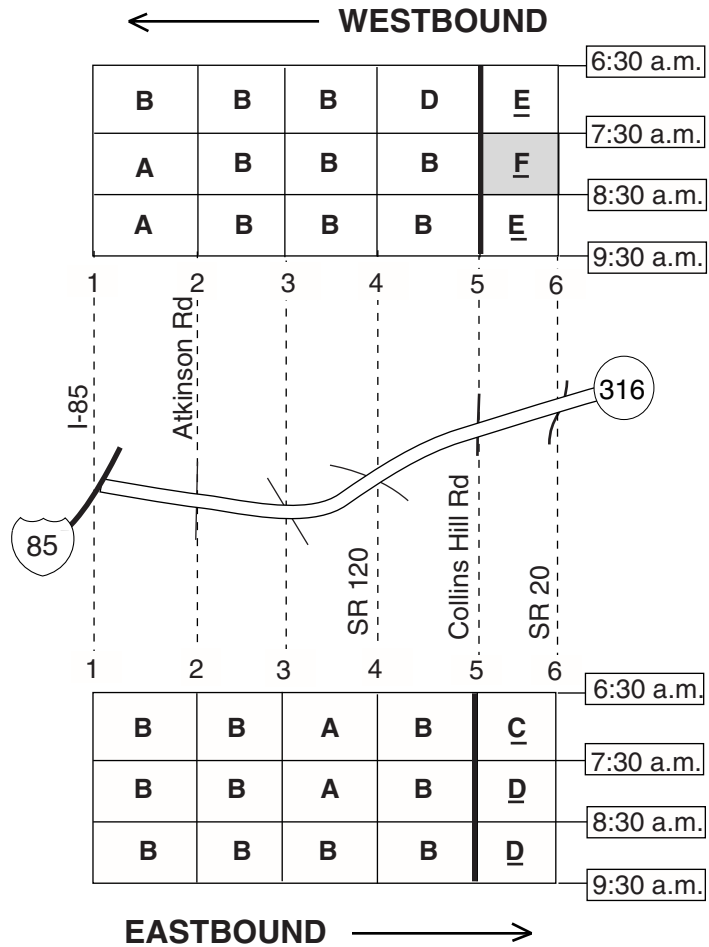
SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

SR 316 **(Gwinnett County)** **MORNING (FALL 2001)**



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F			
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									

SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED
A	B	C	D	E	F	

SR 400 MORNING (FALL 2001)



During the peak period, congestion was found on the southbound entrance ramp at Mansell Rd; when congested, queue populations on the ramp typically ranged from approximately 40 to 50 vehicles per lane (two lanes).

During the peak period, eastbound congestion was found on Holcomb Bridge Rd approaching the signal at SR 400; when congested, approximately 25 to 35 vehicles per lane were queued at the signal (two lanes).

During most observations, southbound congestion was found on Dunwoody Pl approaching the signal at Northridge Rd; at its maximum observed extent, the queue extended back to the vicinity of Roberts Dr (a distance of approx. ½ mile).

During the peak period, congestion was found on the southbound exit ramp at Northridge Rd; when congested, queue populations on the ramp typically contained 25 to 35 vehicles (one lane).

After 7:30 a.m., southbound congestion was typically found on Buford Hwy approaching the southbound entrance ramp at I-85; average estimated speeds typically ranged from 30 to 35 mph. At its maximum observed extent, the queue extended back onto the flyover ramp from I-85.

Windward Pkwy

SR 120

Mansell Rd

Haynes Bridge Rd

SR 140/
Holcomb Bridge Rd

Chattahoochee
River

Northridge Rd

Abernathy Rd

SR 407 Loop

SR 141C

I-85 Ramp

Peachtree St

During the peak period, congestion was found on the southbound exit ramp at State Bridge Rd; when congested, queue populations on the ramp typically contained 20 to 30 vehicles (one lane).



During the peak period, northbound congestion was found on SR 400 between Mansell Rd and the vicinity of SR 120; average estimated speeds typically ranged from approximately 35 to 45 mph. The primary bottleneck was the lane drop (3 lanes to 2) at Haynes Bridge Rd. Traffic entering at the Haynes Bridge Rd Interchange may have contributed to the congestion.

During the peak period, extensive westbound congestion was found on Holcomb Bridge Rd (two left-turn lanes) approaching the signal at SR 400; it appeared extended delays were incurred by travelers waiting in the queue to enter SR 400 (southbound). Congestion on the SR 400 ramp typically extended back through several upstream signals on Holcomb Bridge Rd.

During most observations, an extended zone of southbound congestion was found on SR 400 between Windward Pkwy and the vicinity of Abernathy Rd; average estimated speeds typically ranged from approximately 10 to 30 mph. The primary bottleneck was traffic entering at the Holcomb Bridge Rd Interchange.

Southbound congestion persisted south of Holcomb Bridge Rd; factors contributing to the congestion were 1) the bridge over the Chattahoochee River and 2) traffic entering at Northridge Rd.

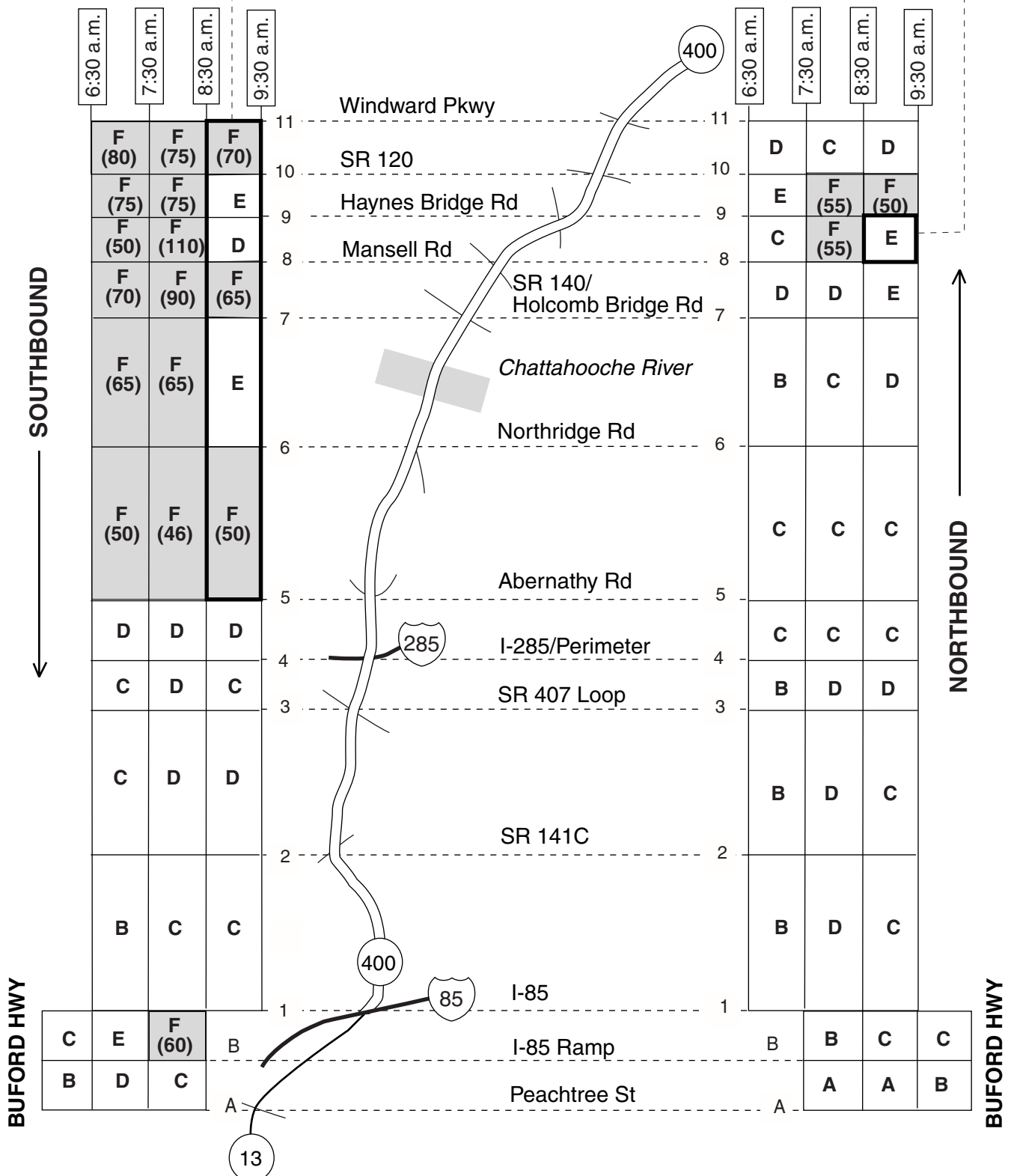
FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 80 and 50 pcplpm with corresponding speed estimates of 20 to 40 mph.

SR 400 MORNING (FALL 1998)

This level-of-service rating represents the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 55 and 45 pcplpm with corresponding speed estimates of 35 to 50 mph.

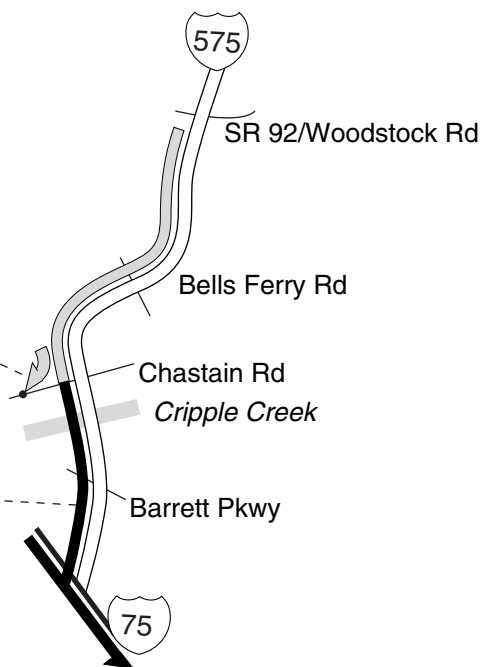






I-575 MORNING (FALL 2001)

Intermittently, congestion was found on the southbound exit ramp at Chastain Rd; when congested, approximately 20 to 30 vehicles per lane were queued at the signal at the head of the ramp (2 lanes).

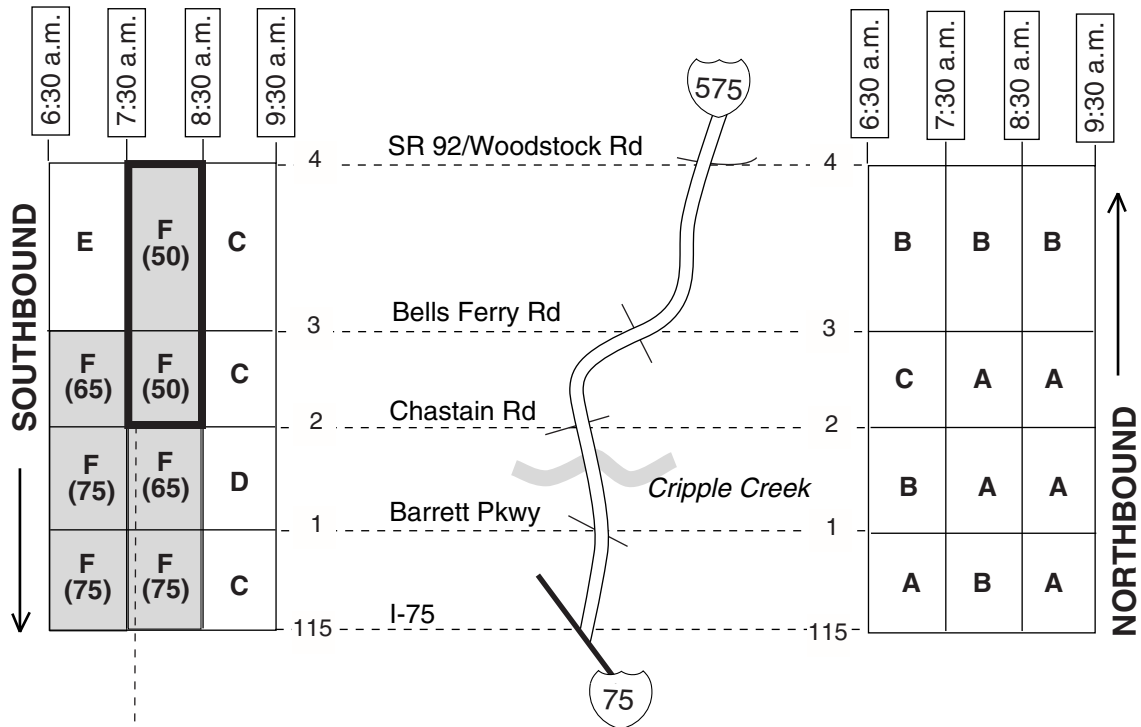
Before 9:00 a.m., southbound congestion was found on I-575 between SR 92 and the terminus at I-75; average estimated speeds typically ranged from approximately 25 to 45 mph. The head of the queue was found on the southbound ramp at the I-75 Interchange.



FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-575 MORNING (FALL 2001)



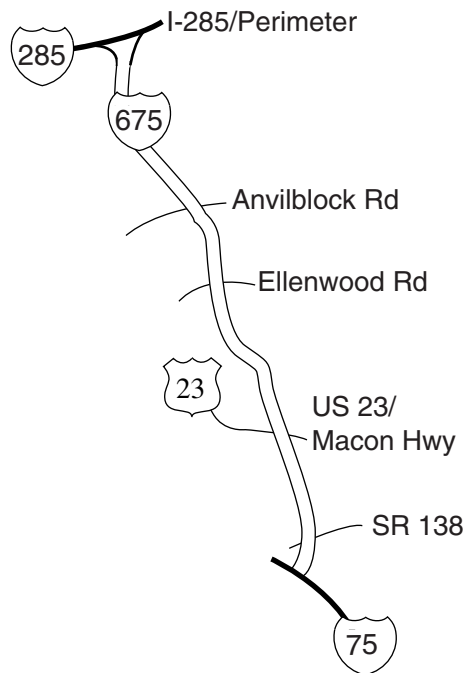
These level-of-service ratings represent the mathematical average of densities, which varied within the hour (congested/not congested); during two observations before 8:00 a.m., densities typically ranged between 75 and 65 pcplpm with corresponding speed estimates of 25 to 30 mph.

LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE
A	B	C	D	E	F	F		
0	10	20	30	45	65			
Density scale (cars per lane-mile)								
Note: F (60) in the tables means level-of-service "F", with density = 60								





I-675 MORNING (FALL 2001)

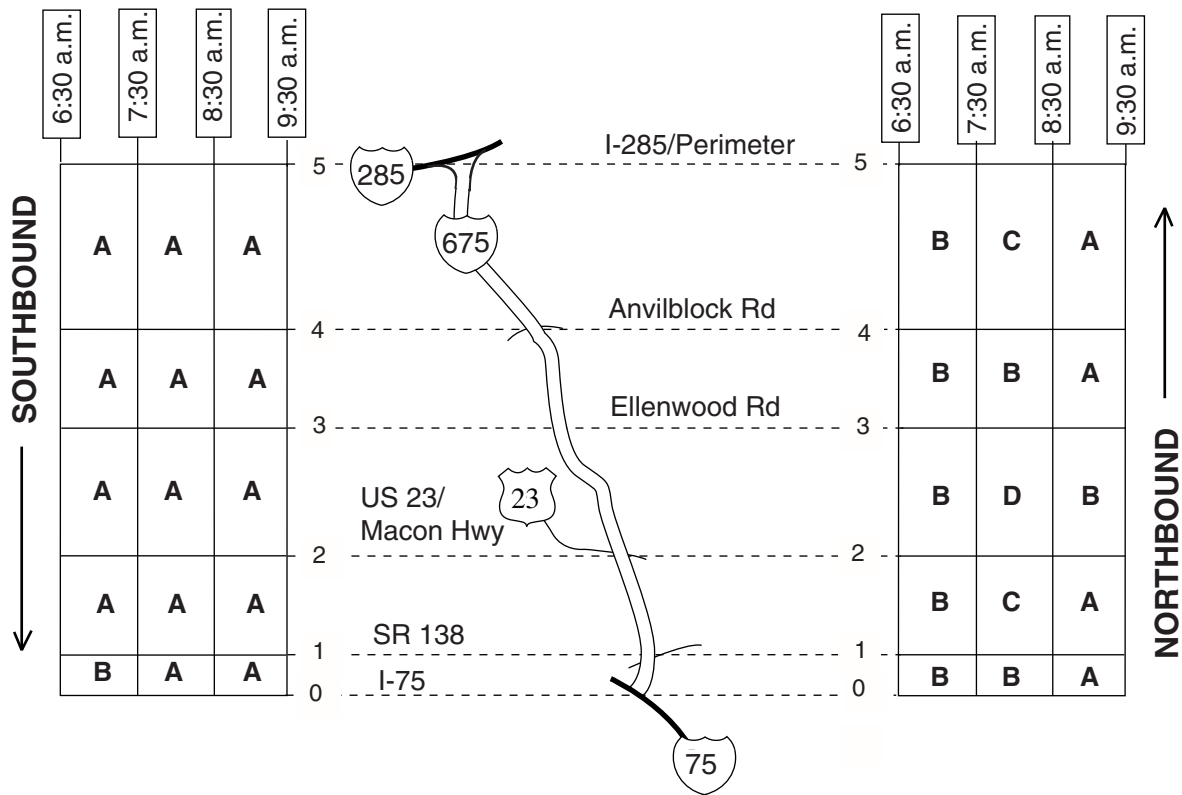


No congestion was found on I-675 during the morning survey period.

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-675 MORNING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

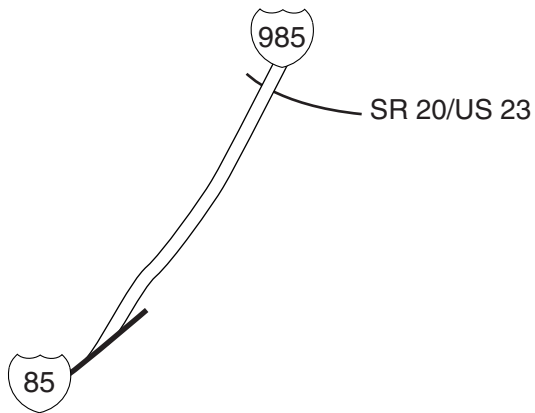
LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F		F	
0	10	20	30	45	65				

Density scale (cars per lane-mile)

Note: F (60) in the tables means level-of-service "F", with density = 60





I-985 MORNING (FALL 2001)

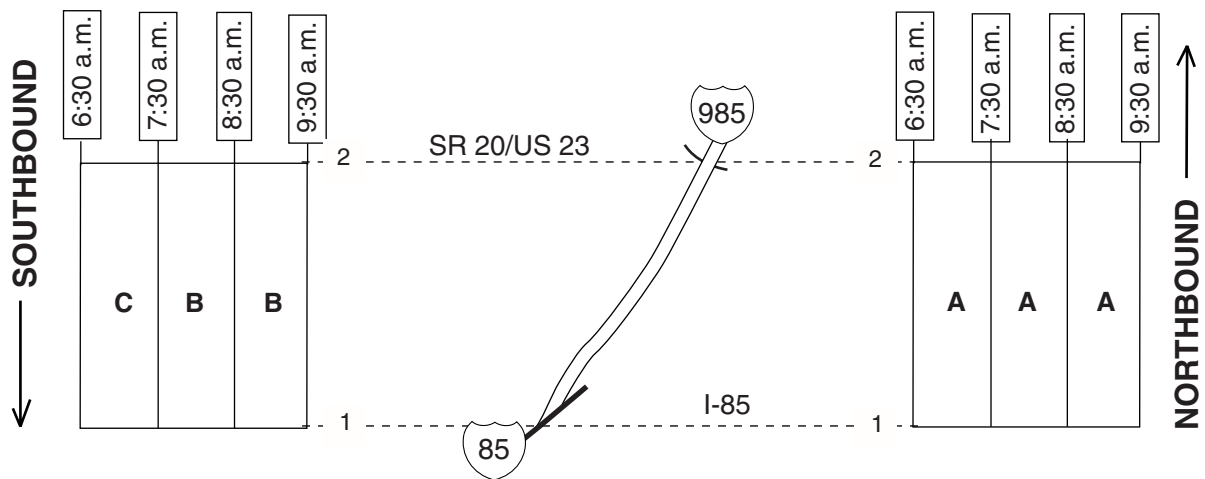


No congestion was found on I-985 during the morning survey period.

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-985 MORNING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									



RIDGEWAY RD / BARRETT PKWY (Cobb County) MORNING (FALL 2001)

During the peak period, southbound congestion was typically found on Barrett Pkwy approaching the signal at Cobb Pkwy; queue populations in the left-turn lane typically ranged from approximately 20 to 30 vehicles per lane (one lane).

During the peak period, southbound congestion was typically found on Cobb Pkwy (US Rte 41) approaching the signal at Barrett Pkwy; queue populations typically ranged from approximately 20 to 40 vehicles per lane (two lanes).

During the peak period, eastbound congestion was typically found on Stilesboro Rd approaching the signal at Barrett Pkwy; queue populations typically ranged from approximately 20 to 40 vehicles (one thru-lane).




During the peak period, eastbound congestion was typically found on Burnt Hickory Rd approaching the signal at Ridgeway Rd; queue populations typically ranged from approximately 20 to 40 vehicles (one thru-lane).

During most observations, eastbound congestion was found on Dallas Hwy approaching the signal at Ridgeway Rd; queue populations typically ranged from 20 to 40 vehicles per lane (two lanes).

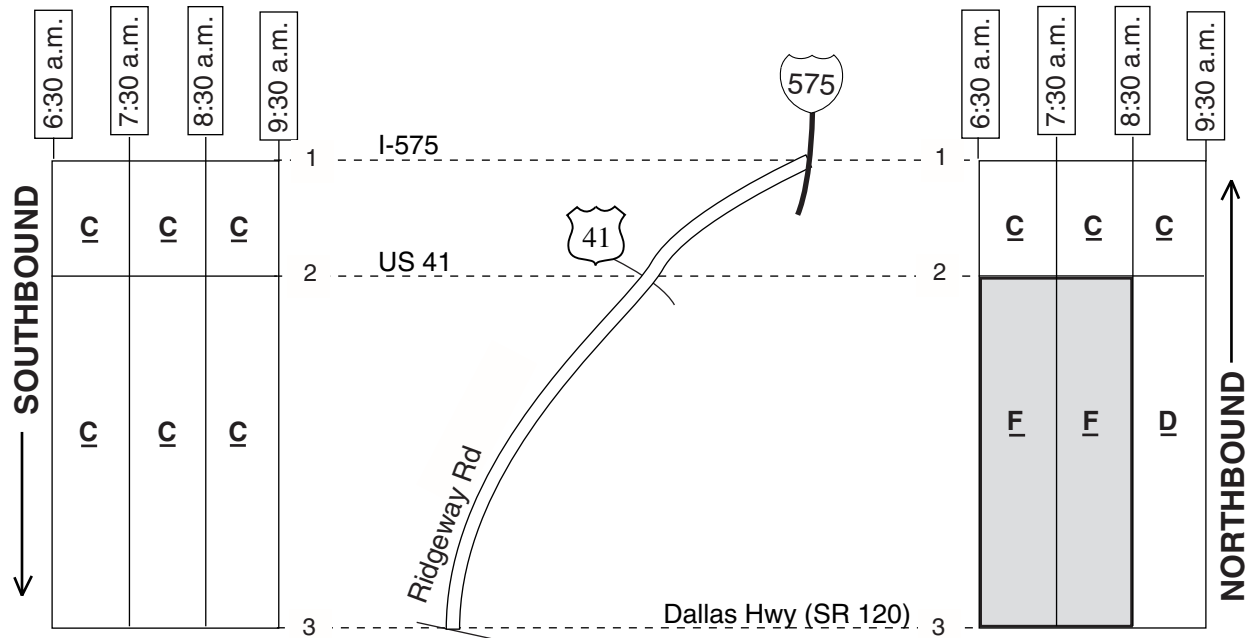
After clearing the signal at Burnt Hickory Rd, northbound travelers typically encountered congestion again at Stilesboro Rd, Old Hwy 41 and Cobb Pkwy (US 41). Queue populations at these signals ranged widely, from approximately 20 to 50 vehicles per lane (two lanes).

During most observations before 9:00 a.m., extended northbound delays were typically found at the signal at Burnt Hickory Rd; queue populations during the peak period often ranged from 40 to 80 vehicles per lane (two lanes). At its maximum observed extent, the signal queue extended upstream for approximately one mile.

SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

**RIDGEWAY RD / BARRETT PKWY
(Cobb County)
MORNING (FALL 2001)**



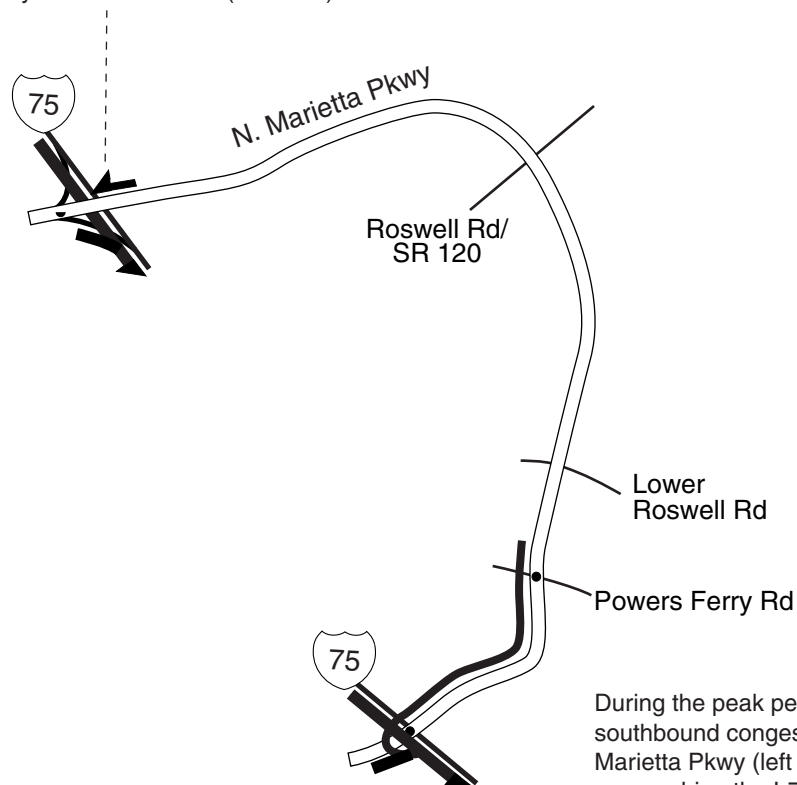
SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F






MARIETTA PKWY (Cobb County) MORNING (FALL 2001)

During the peak period, westbound congestion was typically found on Marietta Pkwy (left-turn lane) approaching the signals at the I-75 Interchange; when congested, queue populations ranged from approximately 20 to 30 vehicles (one lane).

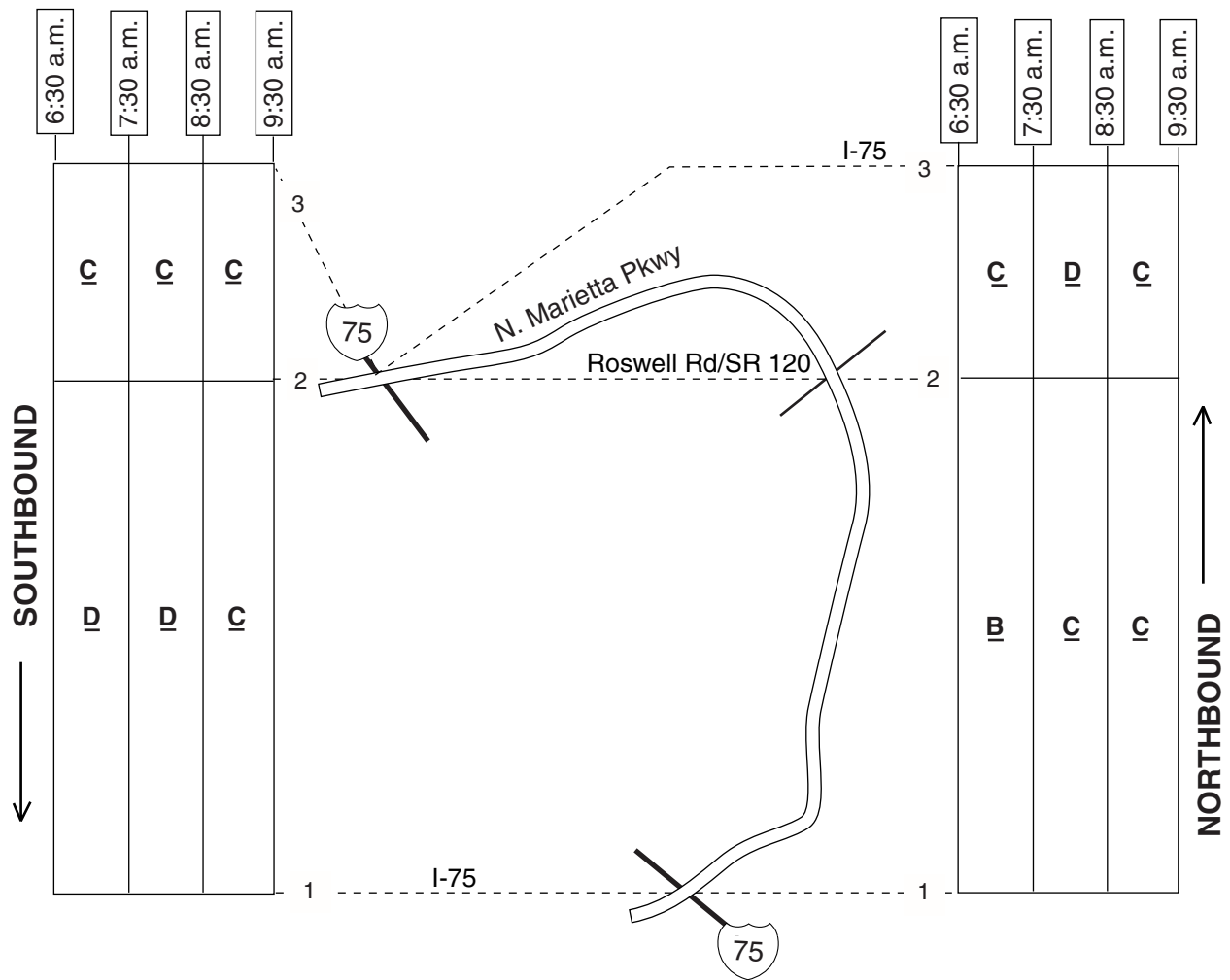


During the peak period, extensive southbound congestion was found on Marietta Pkwy (left two lanes) approaching the I-75 Interchange; it appeared extended delays were incurred by travelers waiting in the queue to enter I-75 (southbound). Congestion on the southbound ramp typically extended back through several upstream signals on Marietta Pkwy; however, through-traffic on Marietta Pkwy appeared to be able to bypass the queue in the right lane.

SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

MARIETTA PKWY (Cobb County) MORNING (FALL 2001)

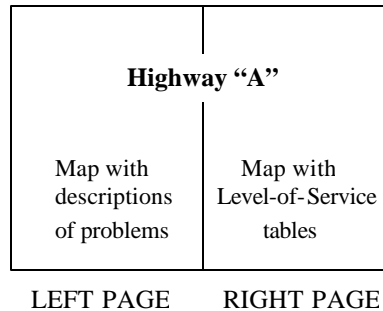


SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F

PART TWO

EVENING SURVEY PERIOD



Each highway is presented in a set of opposing maps. The maps with the technical tables on the right contain averaged level-of-service ratings, minus the effects of any known or suspected incidents (actual density values are provided for all LOS “F” ratings). Details are presented in narratives on the left.

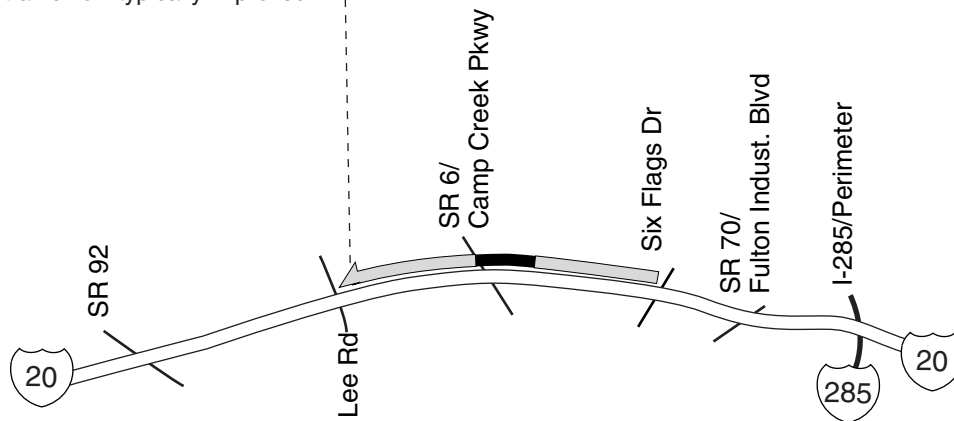
Highways are presented in the following order:

- I-20
- US 41 / 19 – Tara Blvd
- I-75
- US 78 – Stone Mountain Fwy
- I-85
- SR 85
- SR 92
- SR 120 – Dallas Hwy
- SR 120 – Roswell Rd
- SR 120 – State Bridge Rd / Pleasant Hill Rd
- SR 140 – Holcomb Bridge Rd
- SR 141 – Peachtree Industrial Blvd / Peachtree Pkwy / Medlock Bridge Rd
- SR 166 – Campbellton / Lakewood Fwy
- SR 176 / SR 6 / Camp Creek Pkwy
- I-285 - Perimeter
- SR 316
- SR 400
- I-575
- I-675
- I-985
- Barrett Pkwy / Ridgeway Rd
- Marietta Pkwy





I-20 (Between SR 92 & I -285) EVENING (FALL 2001)

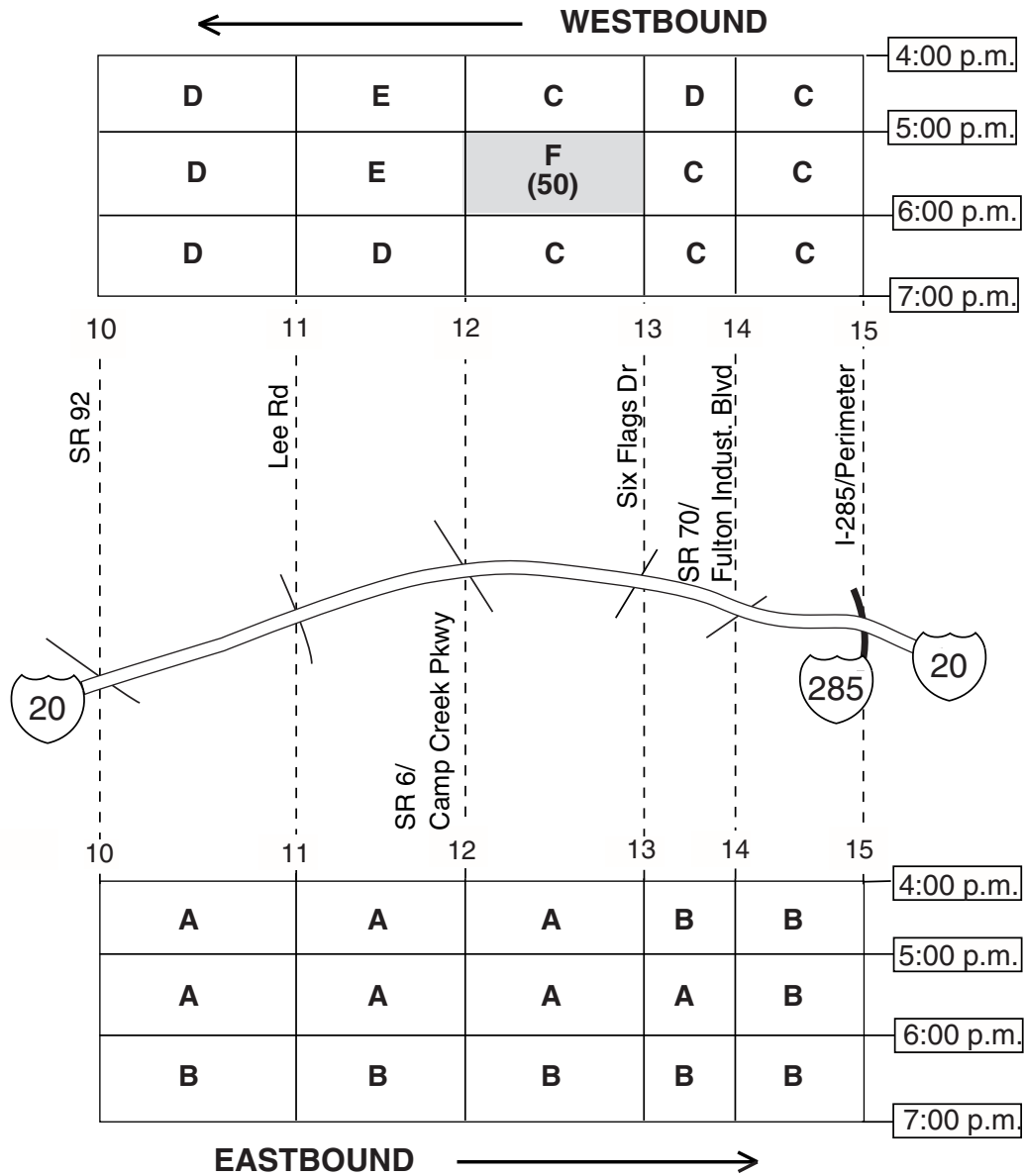
During the peak period, westbound congestion was found on I-20 between Six Flags Dr and Lee Rd; the primary bottleneck was the lane drop (4 lanes to 3) at the Camp Creek Pkwy Interchange. West of Camp Creek Pkwy, traffic flow typically improved.



FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-20 (Between SR 92 & I-285) EVENING (FALL 2001)

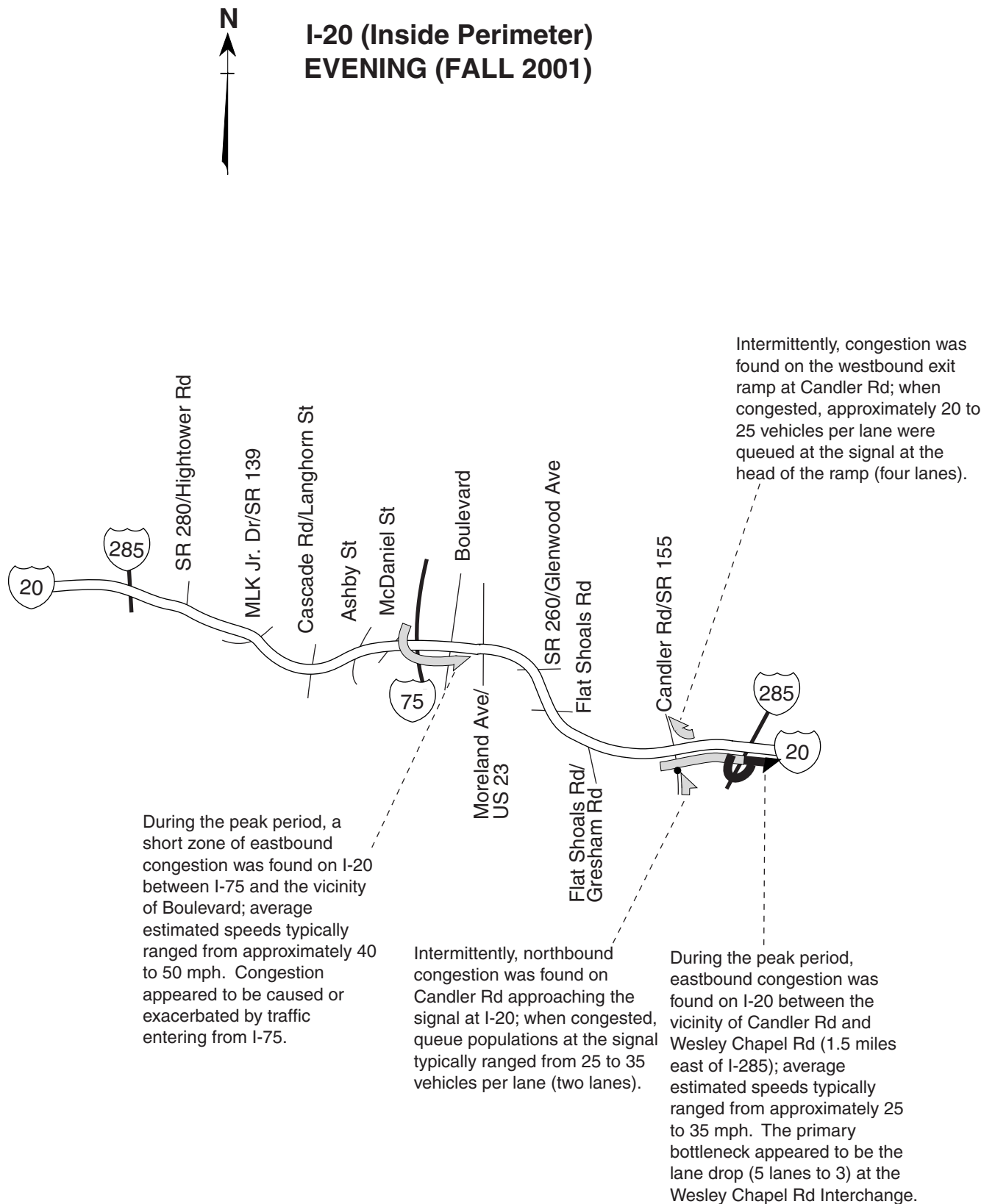


LEVEL-OF-SERVICE LEGEND:

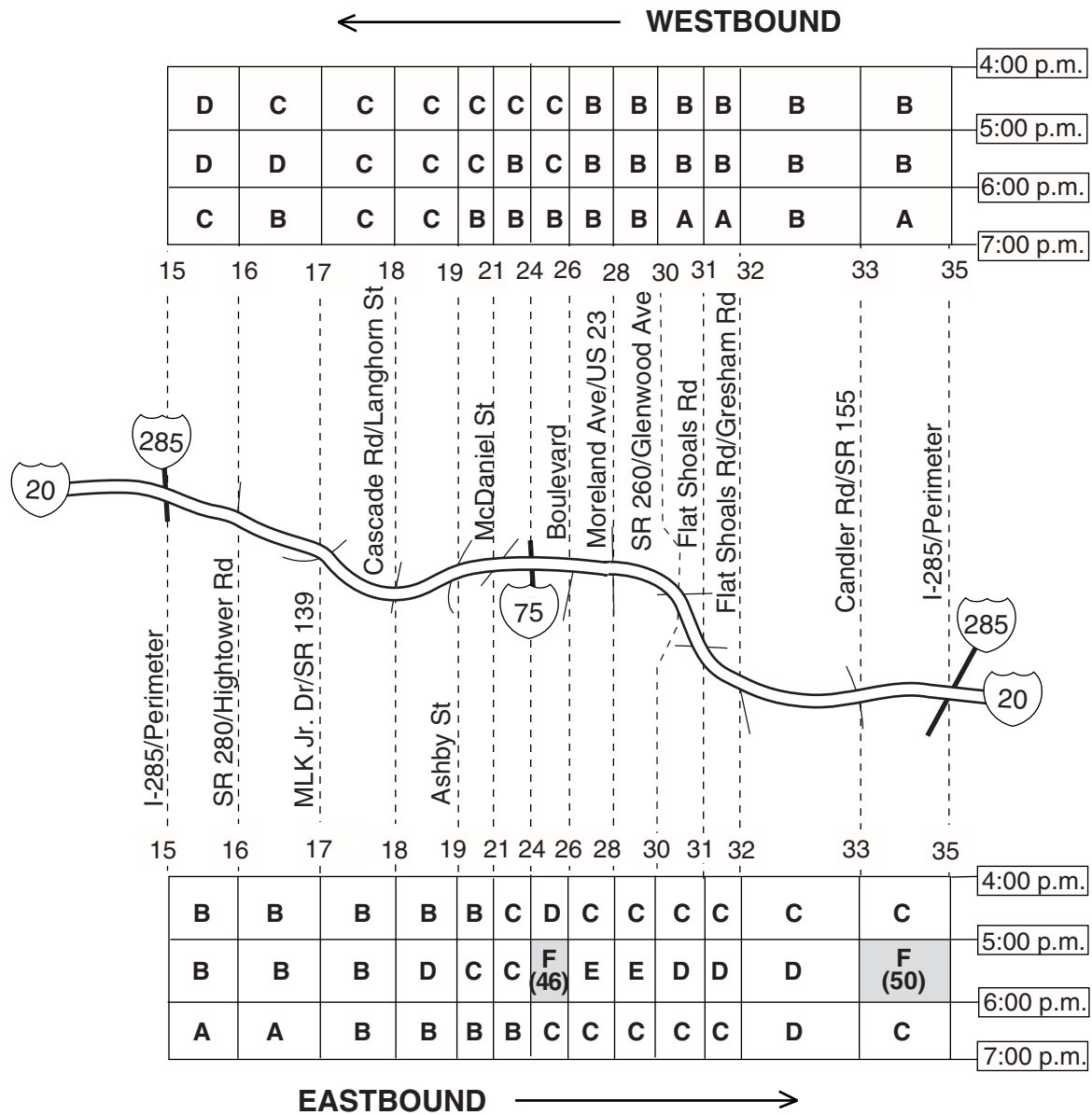
LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F			
0	10	20	30	45	65				

Density scale (cars per lane-mile)

Note: F (60) in the tables means level-of-service "F", with density = 60



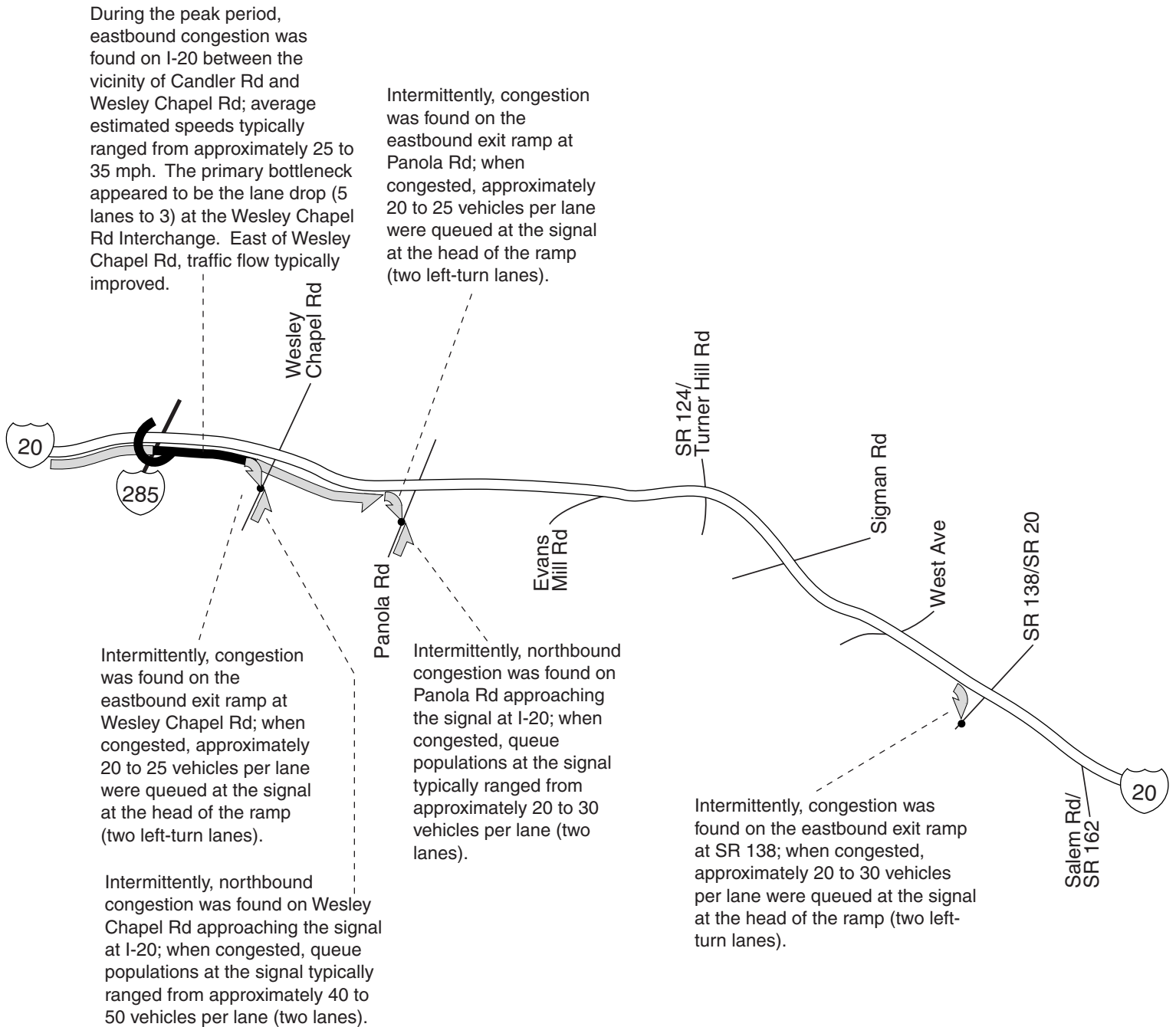
I-20 (Inside Perimeter) EVENING (FALL 1998)



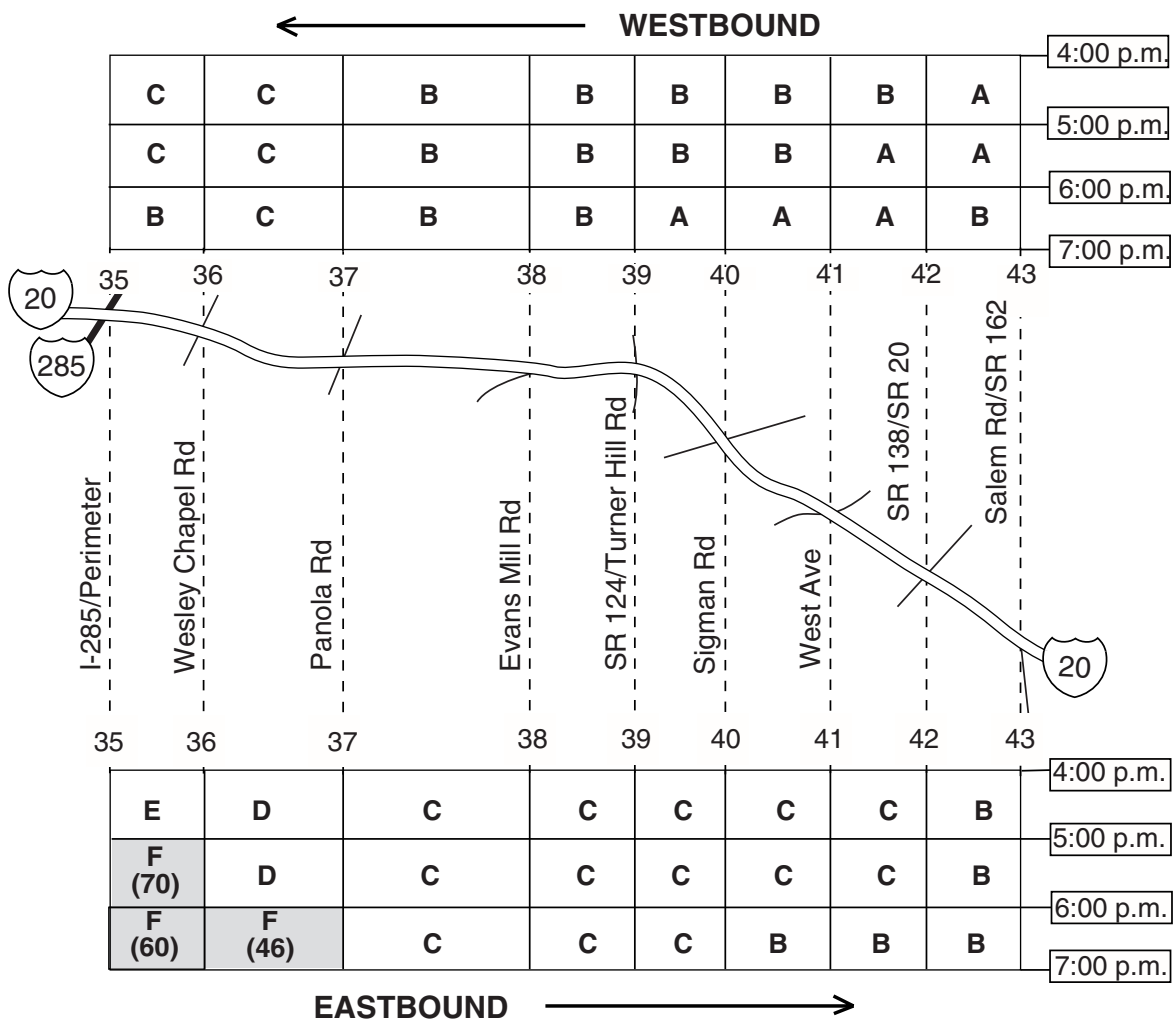
LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F				
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									

I-20 (Between I-285 & Salem Rd) EVENING (FALL 2001)



I-20 (Between I-285 & Salem Rd) EVENING (FALL 2001)



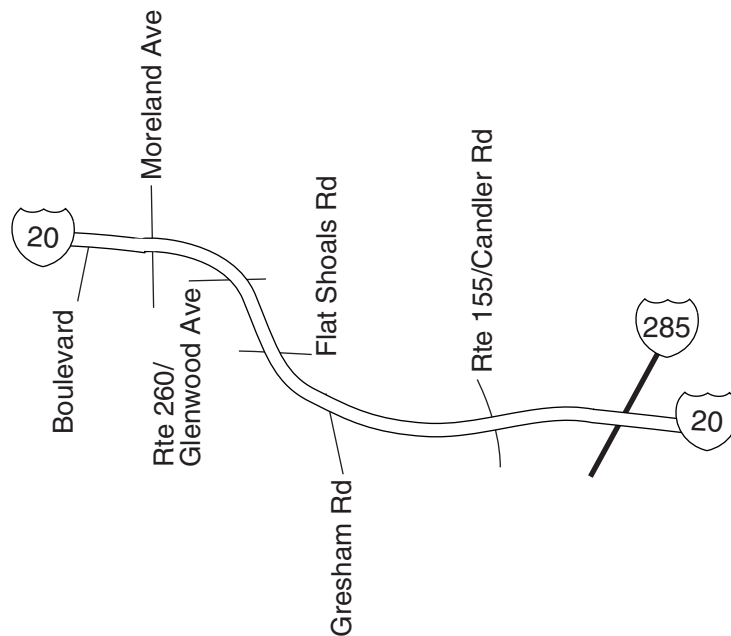
LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE
A	B	C	D	E	F	F		F
0	10	20	30	45	65			
Density scale (cars per lane-mile)								
Note: F (60) in the tables means level-of-service "F", with density = 60								





I-20 (HOV) EVENING (FALL 2001)

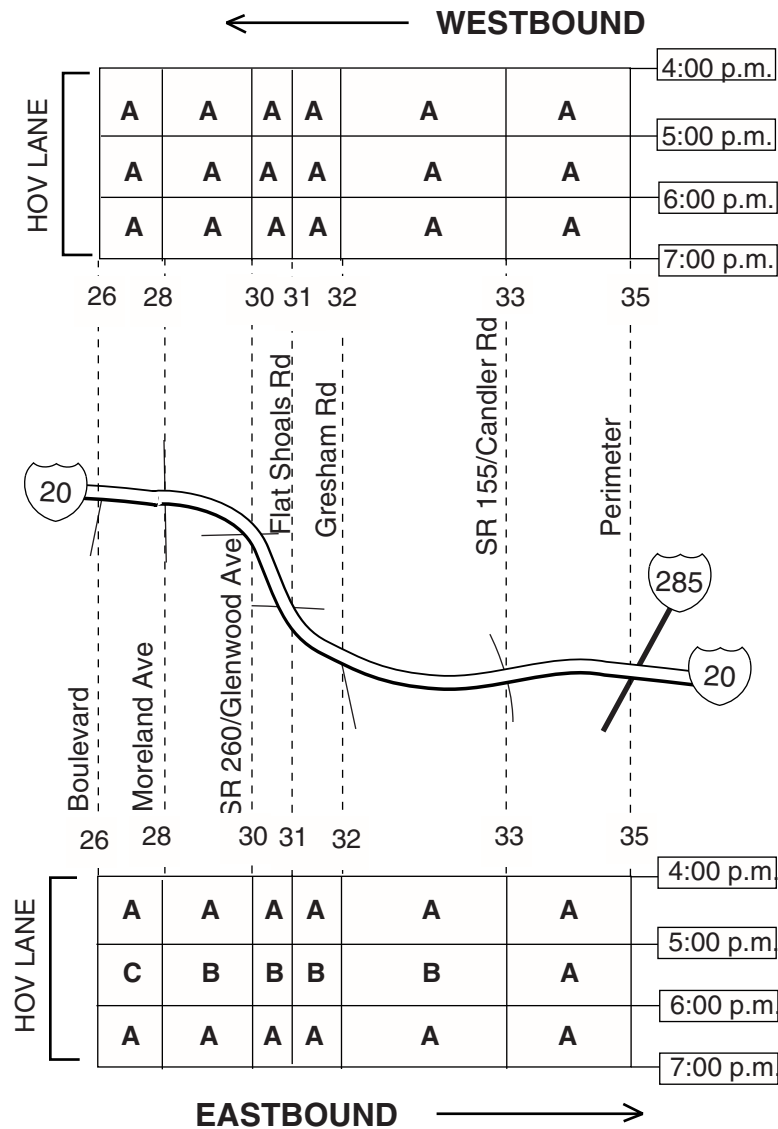
During the evening survey period, no congestion was found on the I-20 HOV facility.



FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-20 (HOV) EVENING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED	SEVERE
A	B	C	D	E	F	F	F
0	10	20	30	45	65		
Density scale (cars per lane-mile)							

Note: F (60) in the tables means level-of-service "F", with density = 60



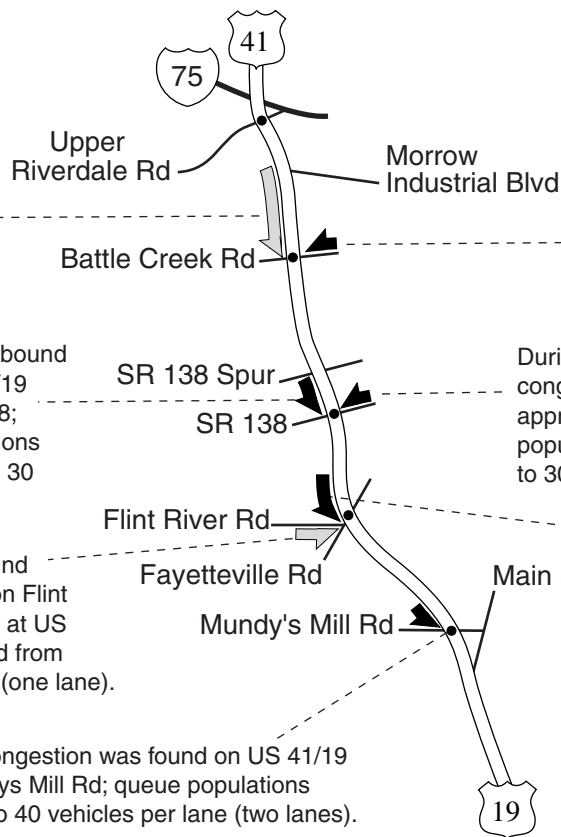
US 41 / 19 (TARA BLVD) (Clayton County) EVENING (FALL 2001)

During most observations, large southbound platoons progressed steadily on US 41/19 south of the I-75 Interchange; however, intermittent southbound congestion was found approaching the signal at Battle Creek Rd.

During most observations, southbound congestion was found on US 41/19 approaching the signal at SR 138; when congested, queue populations ranged from approximately 20 to 30 vehicles per lane (three lanes).

During the peak period, eastbound congestion was typically found on Flint River Rd approaching the signal at US 41/19; queue populations ranged from approximately 20 to 30 vehicles (one lane).

When observed, southbound congestion was found on US 41/19 approaching the signal at Mundy's Mill Rd; queue populations ranged from approximately 20 to 40 vehicles per lane (two lanes).



During most observations, westbound congestion was found on Battle Creek Rd approaching the signal at US 41/19; queue populations typically ranged from 20 to 30 vehicles (one lane).

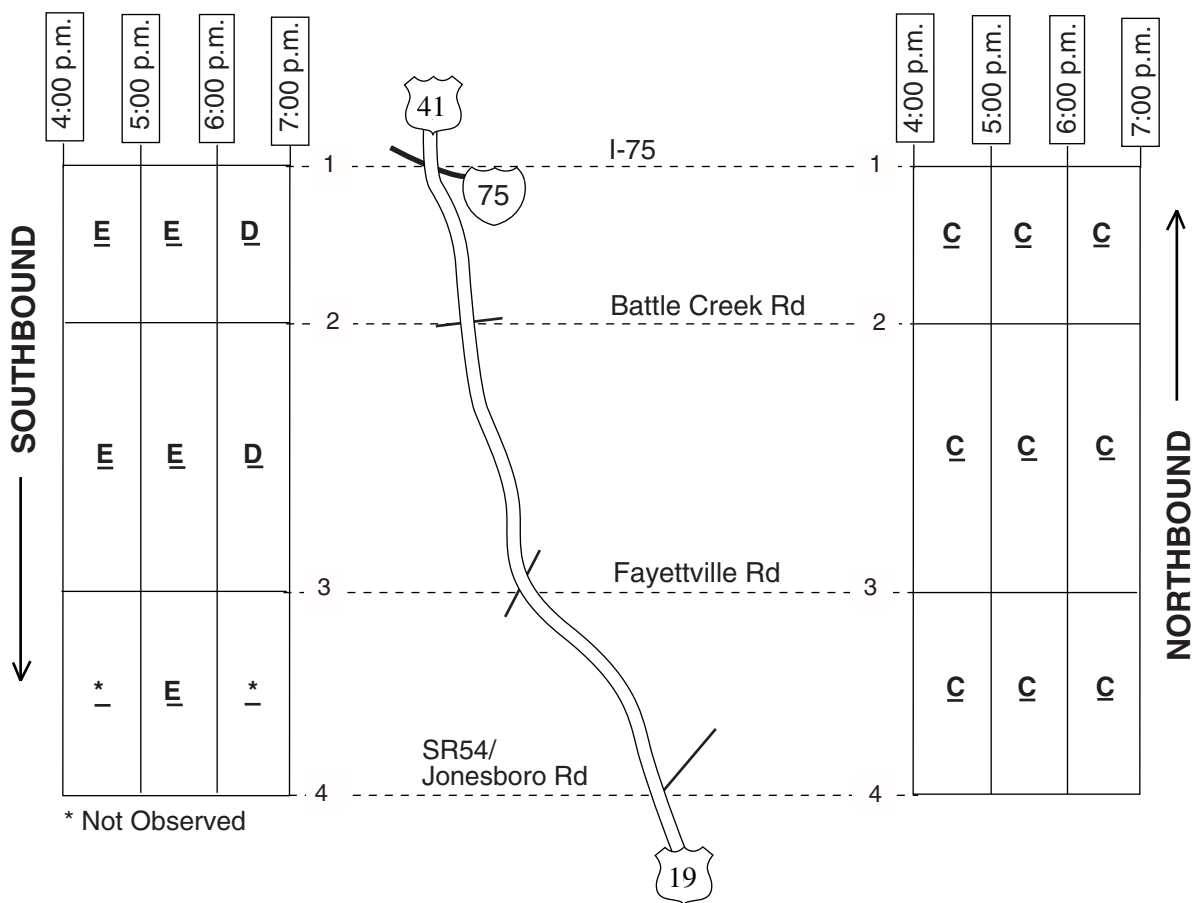
During the peak period, westbound congestion was typically found on SR 138 approaching the signal at US 41/19; queue populations ranged from approximately 20 to 30 vehicles per lane (two thru-lanes).

During most observations, southbound congestion was found on US 41/19 approaching the signal at Fayetteville Rd; queue populations ranged widely from approximately 20 to 50 vehicles per lane (three lanes).

SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)

**US 41 / 19 (TARA BLVD)
(Clayton County)
EVENING (FALL 2001)**



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F



I-75 (Between Glade Rd & I-85) EVENING (FALL 2001)

On one day only, westbound congestion was found on Glade Rd approaching the signal at I-75; approximately 20 to 25 vehicles were queued at the signal (left-turn lane only).

On one day only, congestion was found on the northbound exit ramp at Wade Green Rd; approximately 30 to 35 vehicles were queued at the signal at the head of the ramp (right-turn lane only).

On one day only, congestion was found on the northbound exit ramp at Chastain Rd; approximately 30 to 35 vehicles per lane were queued at the signal at the head of the ramp (two left-turn lanes).

During the peak period, congestion was typically found on the northbound entrance ramp at the Canton Rd Connector; at its maximum observed extent, the queue extended back onto the right lane of the Canton Rd Connector (a distance of approx. one-mile).

During the peak period, a 7 to 8 mile zone of northbound congestion was found on I-75 between the Perimeter and the Canton Rd Connector; congestion appeared to be caused by the series of lane drops (8 lanes to 5) between these interchanges. Traffic entering at the Canton Rd Connector Interchange also contributed to the congestion. Average estimated speeds typically ranged from approximately 30 to 50 mph.

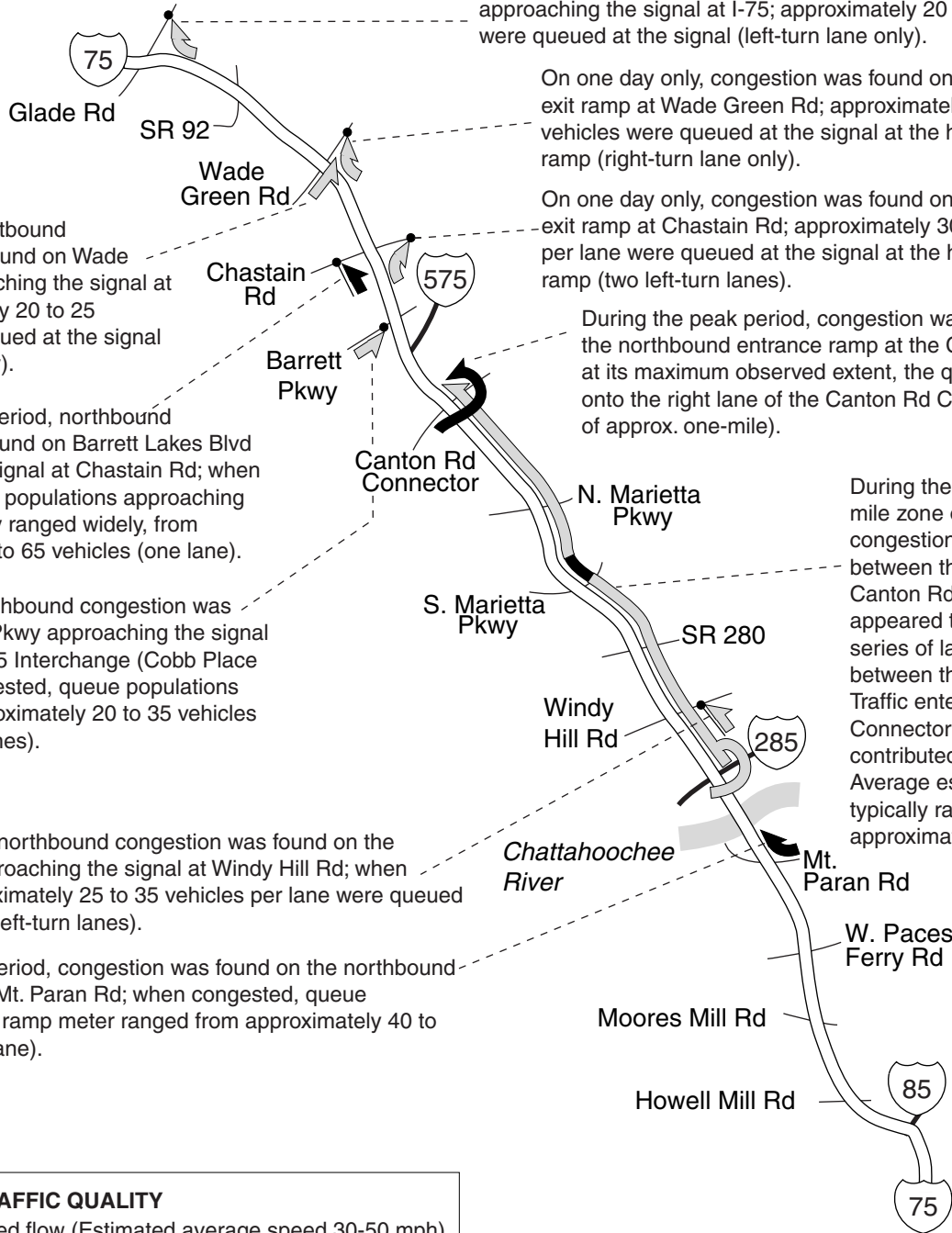
One day only, eastbound congestion was found on Wade Green Rd approaching the signal at I-75; approximately 20 to 25 vehicles were queued at the signal (left-turn lane only).

During the peak period, northbound congestion was found on Barrett Lakes Blvd approaching the signal at Chastain Rd; when congested, queue populations approaching the signal typically ranged widely, from approximately 25 to 65 vehicles (one lane).



Intermittently, northbound congestion was found on Barrett Pkwy approaching the signal just before the I-75 Interchange (Cobb Place Blvd); when congested, queue populations ranged from approximately 20 to 35 vehicles per lane (three lanes).

Before 6:00 p.m., northbound congestion was found on the frontage road approaching the signal at Windy Hill Rd; when congested, approximately 25 to 35 vehicles per lane were queued at the signal (two left-turn lanes).

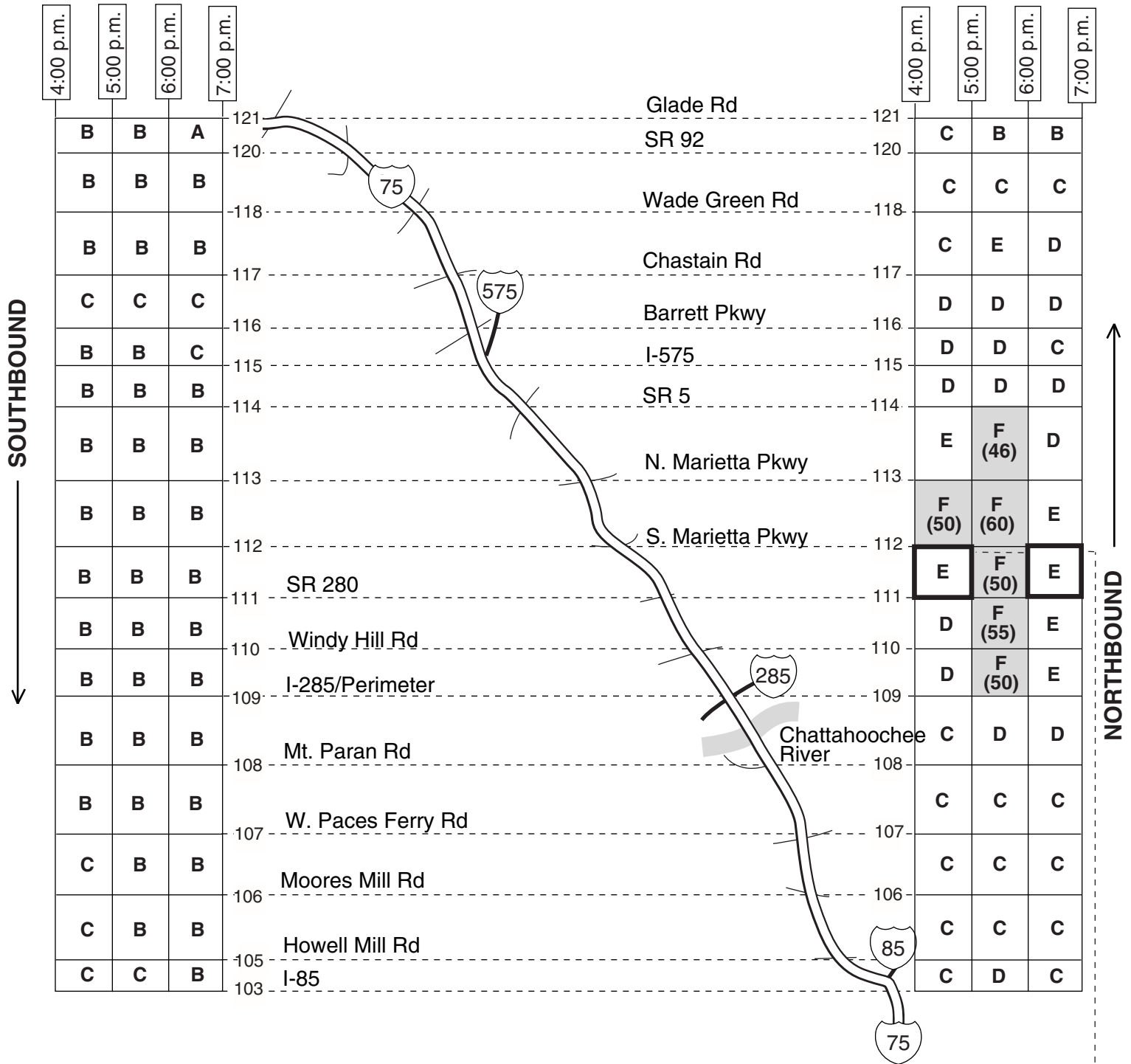
During the peak period, congestion was found on the northbound entrance ramp at Mt. Paran Rd; when congested, queue populations at the ramp meter ranged from approximately 40 to 50 vehicles (one lane).



FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-75 (Between Glade Rd & I-85) EVENING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F			
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									

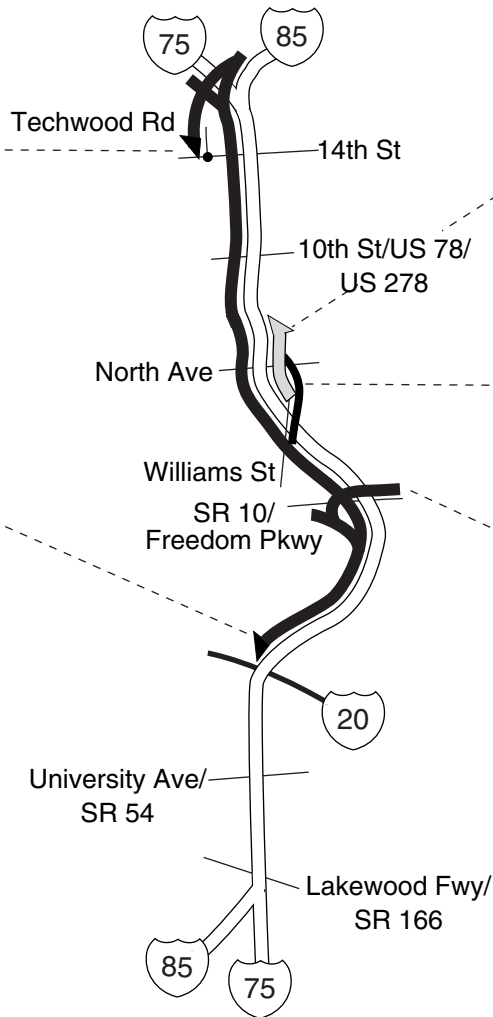
These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 55 and 45 pcplpm with corresponding speed estimates of 35 to 45 mph.



I-75 / 85 EVENING (FALL 2001)

During the peak period, southbound congestion was found on Techwood Dr approaching the signal at 14th St; when congested, the queue typically extended back into the mainline of I-85 (southbound) (a distance of approximately 1/2 mile).

Throughout the evening survey period, southbound congestion was found on I-75/85 between I-85 and I-20; during the peak period, average estimated speeds typically ranged from approximately 15 to 25 mph. Congestion appeared to be caused or exacerbated by the weaving associated with vehicles exiting at the I-20 Interchange.





During the peak period, northbound congestion was found on I-75/85 in the vicinity of North Ave; vehicles entering at North Ave appeared to cause or exacerbate the congestion. Average estimated speeds along this segment typically ranged from approximately 40 to 50 mph.

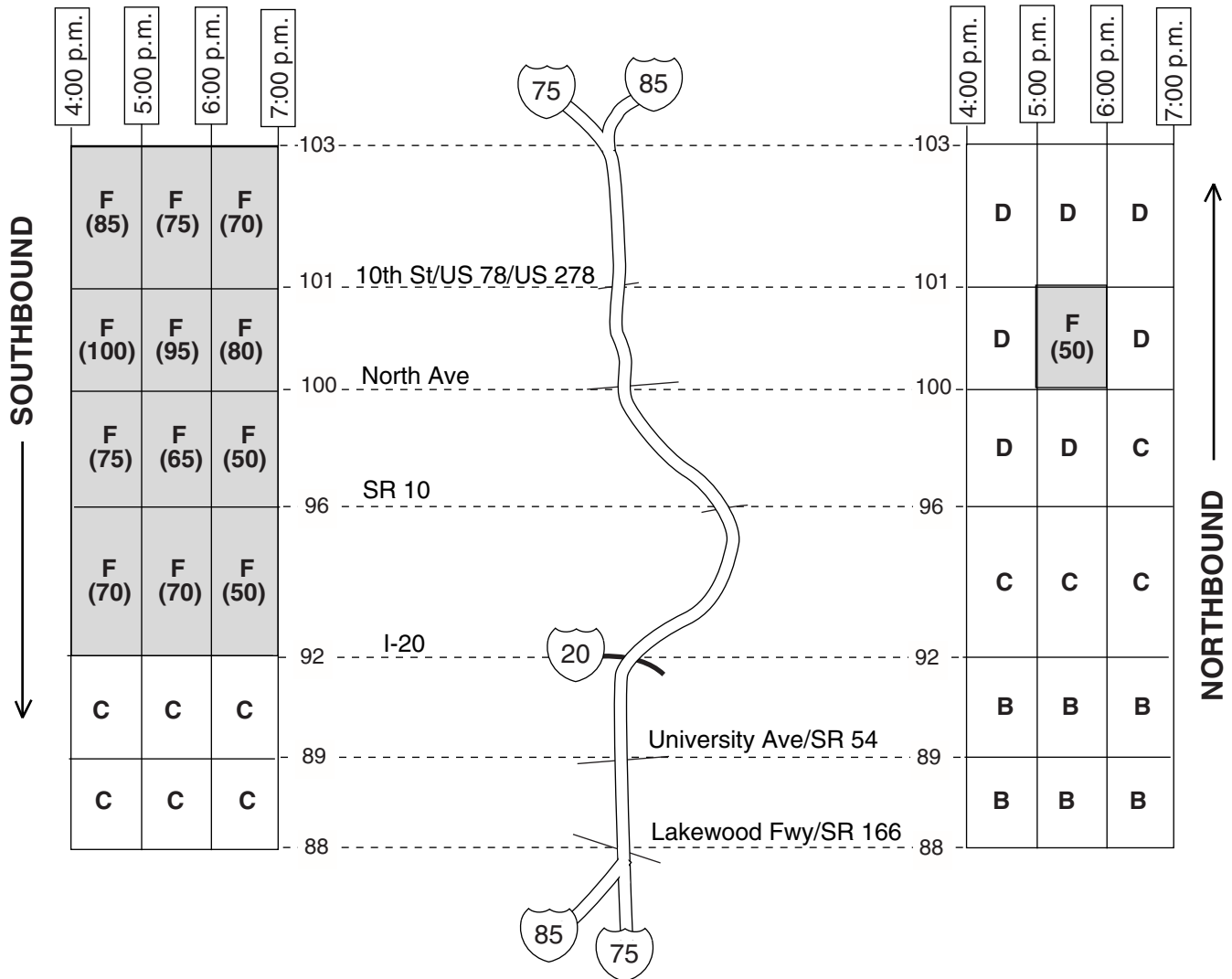
During the peak period, congestion was found on the northbound entrance ramp at North Ave; at its maximum observed extent, the queue extended back onto the flyover ramp from Williams St.

During most observations, congestion was found on the southbound entrance ramps at SR 10; when congested, queue populations ranged widely, from approximately 40 to 80 vehicles (one lane).

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-75 / 85 EVENING (FALL 2001)

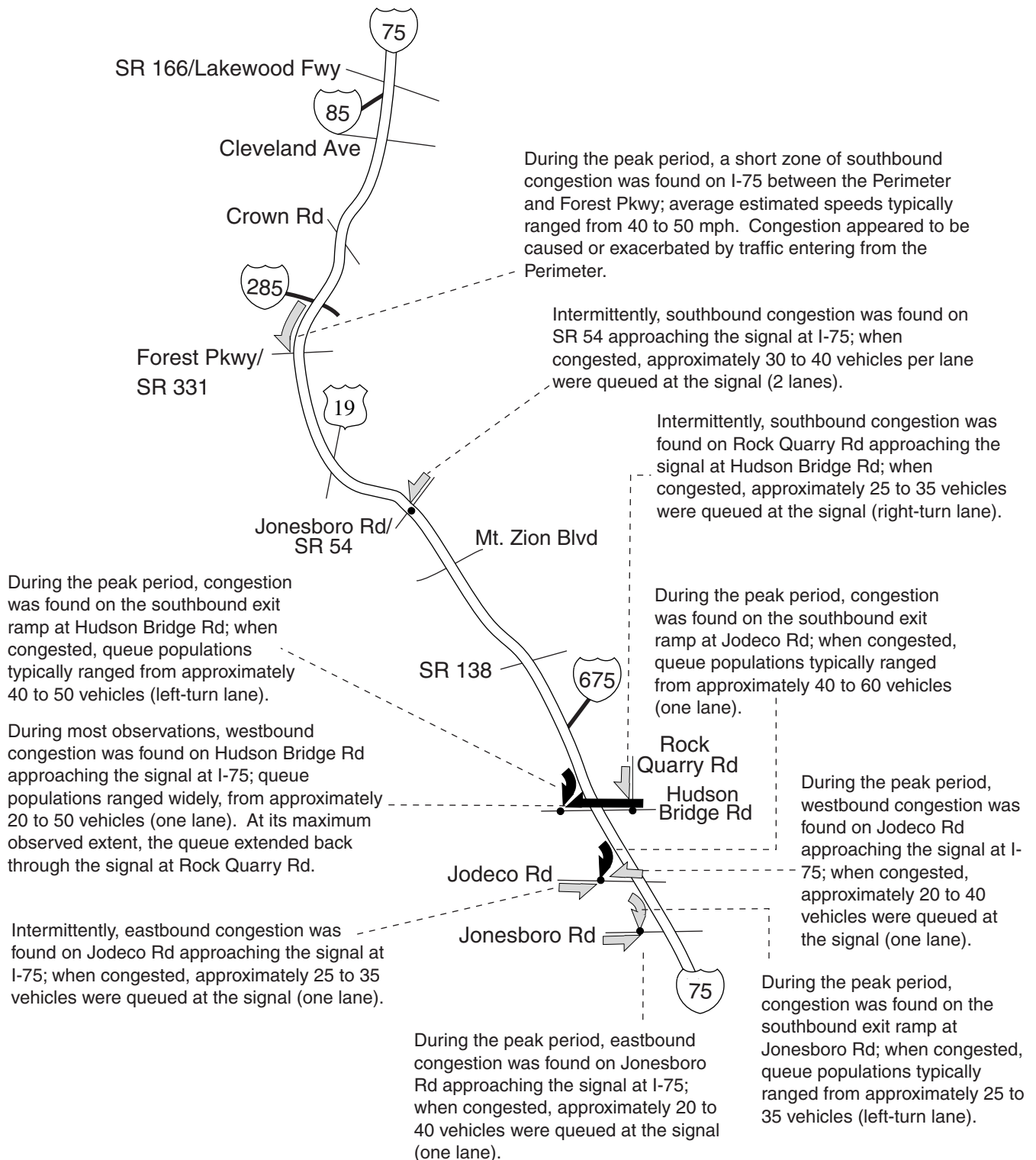


LEVEL-OF-SERVICE LEGEND:

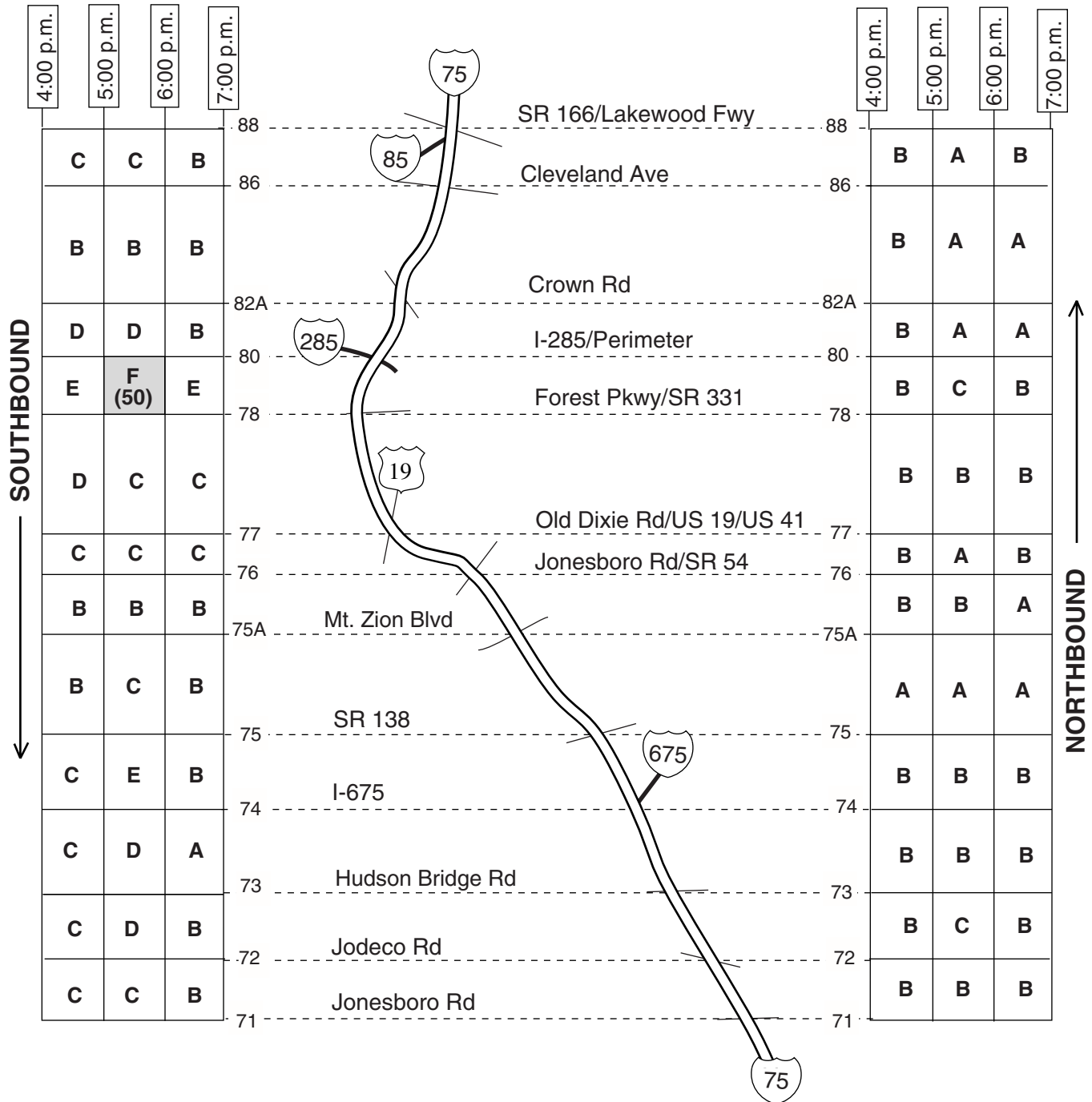
LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									



I-75 (Between I-85 & Jonesboro Rd) EVENING (FALL 2001)

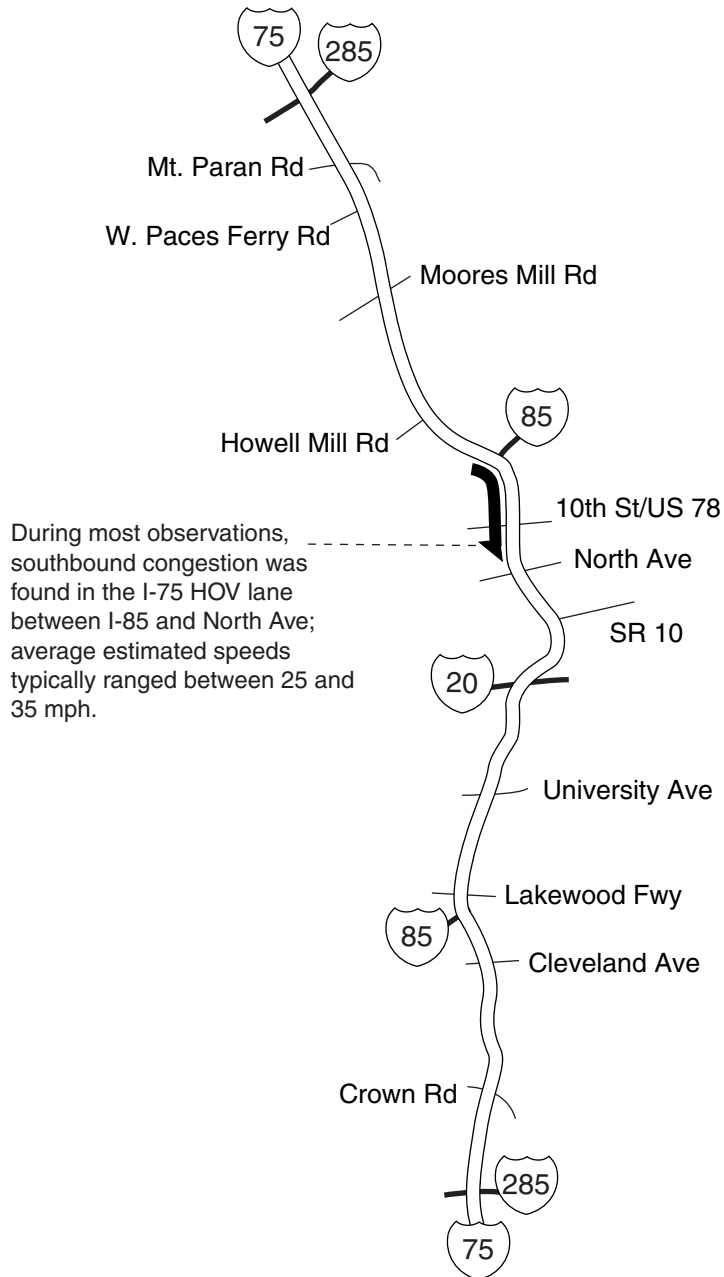


I-75 (Between I-85 & Jonesboro Rd) EVENING (FALL 2001)







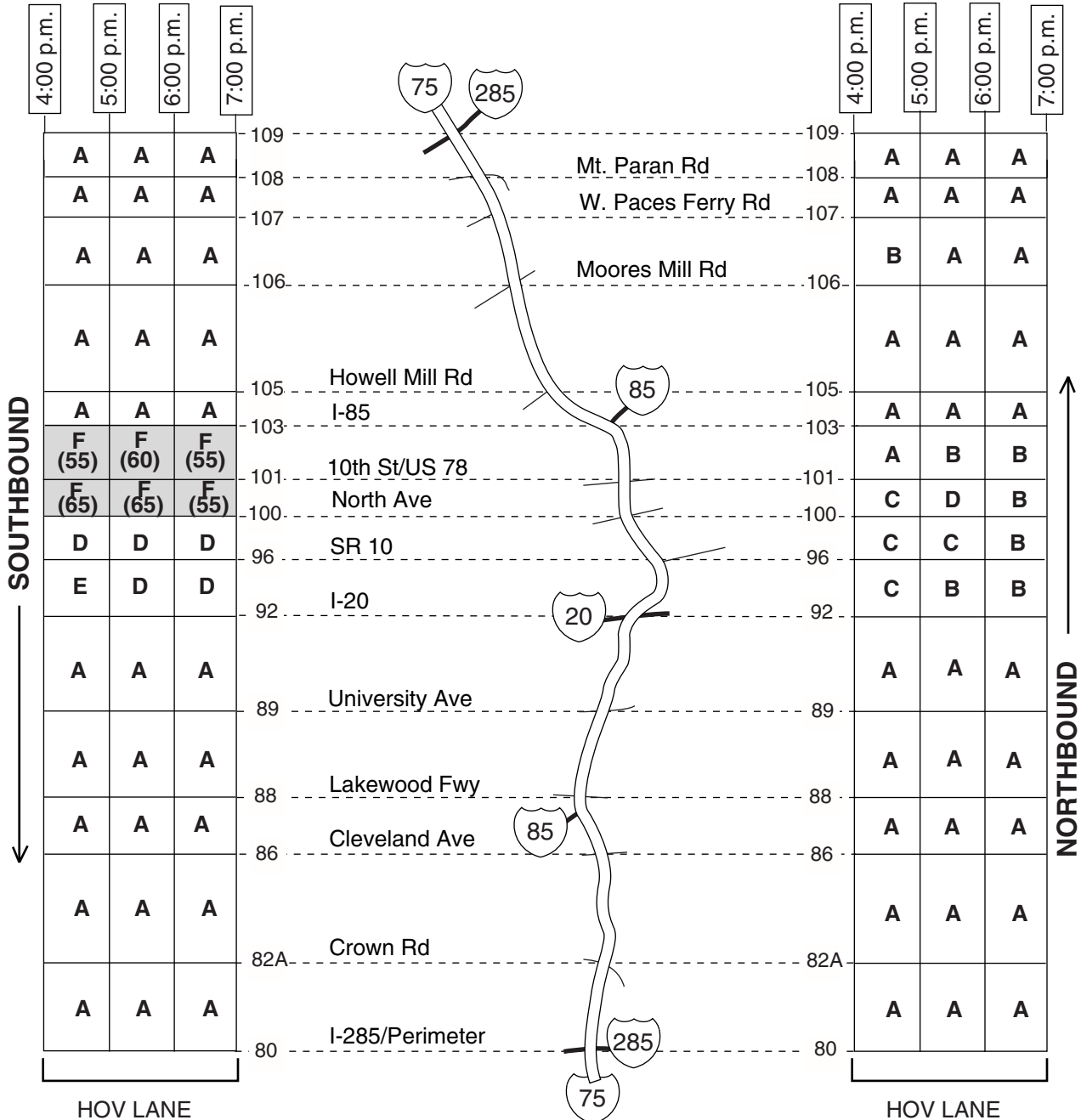
I-75 (HOV) EVENING (FALL 2001)



FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-75 (HOV) EVENING (FALL 2001)

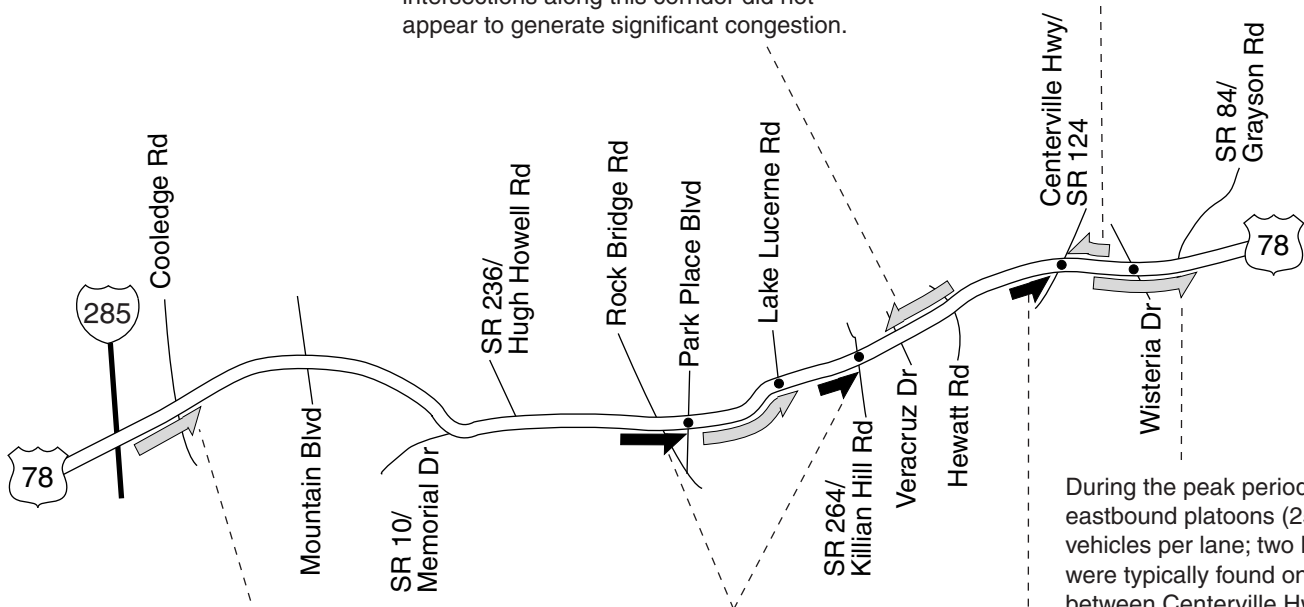




US 78 (STONE MOUNTAIN FWY) EVENING (FALL 2001)

Intermittently, large westbound platoons were found progressing steadily on US 78 between Centerville Hwy and Killian Hill Rd; platoon populations typically ranged from approximately 25 to 35 vehicles per lane (two lanes). The signalized intersections along this corridor did not appear to generate significant congestion.

Intermittently, westbound congestion was found on US 78 approaching the signal at Centerville Hwy; when congested, queue populations ranged from 20 to 25 vehicles per lane (two lanes).



During the peak period, eastbound congestion was found on US 78 between the Perimeter and the vicinity of Coolidge Rd; average estimated speeds typically ranged from approximately 35 to 45 mph. Factors contributing to the congestion were 1) the lane drop (4 lanes to 3) at Coolidge Rd and 2) traffic entering at the Coolidge Rd Interchange.

Throughout the evening survey period, eastbound congestion was found on US 78 between the terminus of the freeway section and Killian Hill Rd; the primary bottlenecks were found at the signals at Park Place Blvd, Lake Lucerne Rd and Killian Hill Rd. Queue populations at the signals typically ranged from approximately 20 to 55 vehicles per lane (three lanes).

During the peak period, large eastbound platoons (25 to 35 vehicles per lane; two lanes) were typically found on US 78 between Centerville Hwy and Grayson Rd; while intermittent congestion was found at the signal at Wisteria Dr, eastbound traffic appeared to progress steadily along this section of US 78.

During most observations, eastbound congestion was found on US 78 approaching the signal at Centerville Hwy; queue populations typically ranged from 20 to 40 vehicles per lane (two thru-lanes).

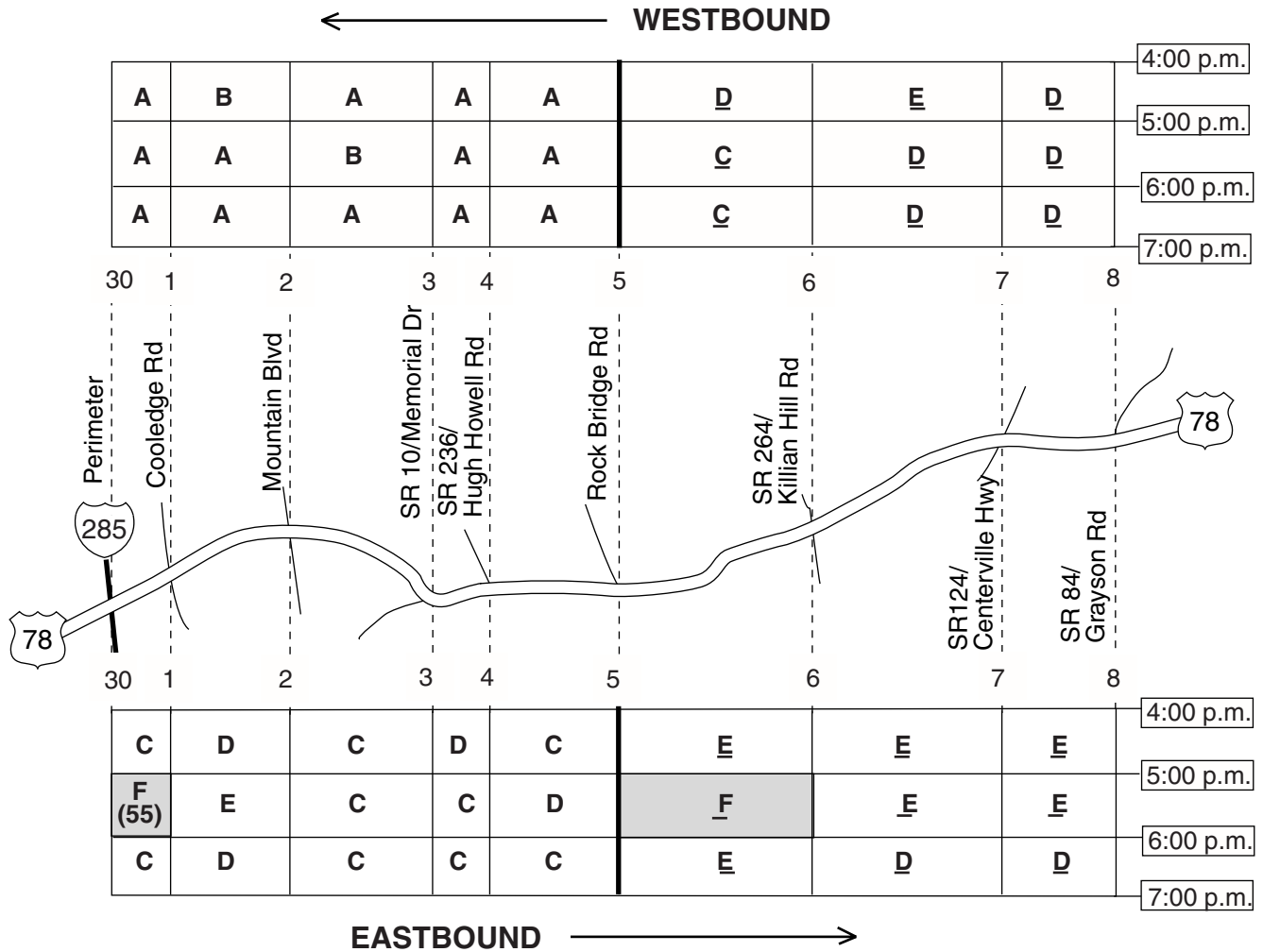
SIGNALIZED HIGHWAY TRAFFIC QUALITY

- Intermittent congestion or slow moving platoons along a highway segment
- Congested signalized intersection (intermittent)
- Congested signalized intersection (continuous)

FREEWAY TRAFFIC QUALITY

- Congested flow (Estimated average speed 30-50 mph)
- Congested flow (Estimated average speed < 30 mph)

US 78 (STONE MOUNTAIN FWY) EVENING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE
A	B	C	D	E	F			F
0	10	20	30	45	65			

Density scale (cars per lane-mile)
Note: F (60) in the tables means level-of-service "F", with density = 60

SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED
A	B	C	D	E		F

I-85 (Between SR 20 and I-75) EVENING (FALL 2001)

Intermittently, southbound congestion was found on SR 317 approaching the signal at I-85; when congested, approximately 25 to 35 vehicles per lane were queued at the signal (two lanes). At its maximum observed extent, the queue extended back onto Satellite Blvd.

During the peak period, eastbound congestion was found on Old Peachtree Rd approaching the signal at I-85; when congested, approximately 20 to 35 vehicles were queued at the signal (one lane).

Intermittently, eastbound congestion was found on Beaver Ruin Rd approaching the signal at I-85; when congested, approximately 20 to 25 vehicles per lane were queued at the signal (two lanes).

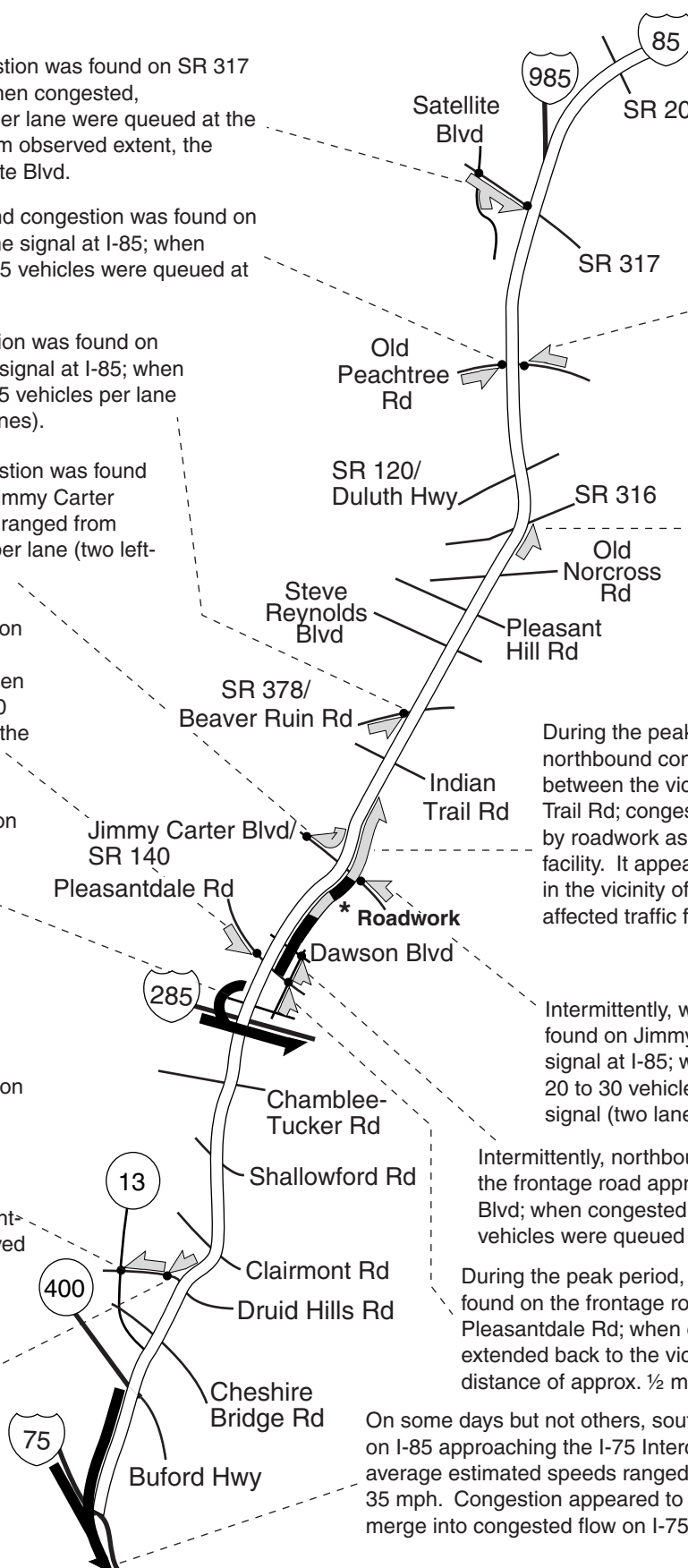
During most observations, congestion was found on the southbound exit ramp at Jimmy Carter Blvd; queue populations typically ranged from approximately 20 to 30 vehicles per lane (two left-turn lanes).

Intermittently, eastbound congestion was found on Pleasantdale Rd approaching the signal at I-85; when congested, approximately 20 to 30 vehicles per lane were queued at the signal (two lanes).

During the peak period, congestion was typically found on the southbound exit ramp to the Perimeter (eastbound). In some cases the ramp was completely filled with vehicles.

Intermittently, westbound congestion was found on Druid Hills Rd approaching the signal at Buford Hwy; when congested, queue populations at the signal typically ranged from 30 to 35 vehicles (right-turn lane). At its maximum observed extent, the queue extended back onto the I-75 exit ramp.

Intermittently, congestion was found on the southbound exit ramp at Druid Hills Rd; when congested, approximately 20 to 25 vehicles per lane were queued at the signal at the head of the ramp (two left-turn lanes).



During the peak period, westbound congestion was found on Old Peachtree Rd approaching the signal at I-85; when congested, approximately 20 to 30 vehicles were queued at the signal (one lane).

On some days but not others, northbound congestion was found on I-85 approaching the SR 316 Interchange, when congested, average estimated speeds ranged from approximately 40 to 50 mph. The lane drop (7 lanes to 6) where the HOV facility ends may have caused or exacerbated the congestion.

During the peak period, intermittent zones of northbound congestion were found on I-85 between the vicinity of Perimeter and Indian Trail Rd; congestion was caused or exacerbated by roadwork associated with the new HOV facility. It appeared that pavement rehabilitation in the vicinity of Jimmy Carter Blvd significantly affected traffic flow along this section of I-85.

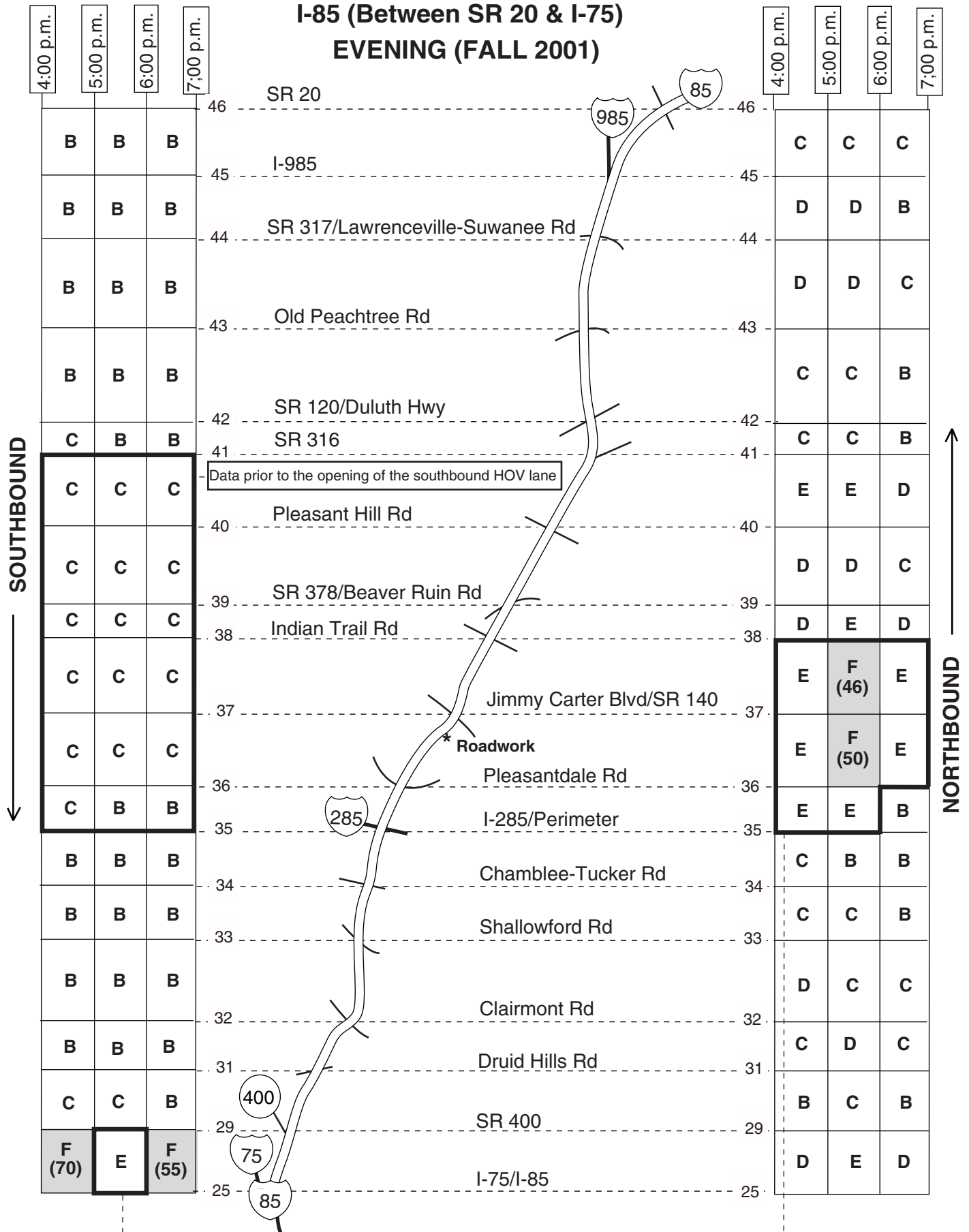
Intermittently, westbound congestion was found on Jimmy Carter Blvd approaching the signal at I-85; when congested, approximately 20 to 30 vehicles per lane were queued at the signal (two lanes).

Intermittently, northbound congestion was found on the frontage road approaching the signal at Dawson Blvd; when congested, approximately 25 to 25 vehicles were queued at the signal (one lane).

During the peak period, northbound congestion was found on the frontage road approaching the signal at Pleasantdale Rd; when congested, the queue typically extended back to the vicinity of Northcrest Rd (a distance of approx. ½ mile).

On some days but not others, southbound congestion was found on I-85 approaching the I-75 Interchange; when congested, average estimated speeds ranged widely, from approximately 15 to 35 mph. Congestion appeared to be caused or exacerbated by the merge into congested flow on I-75.

I-85 (Between SR 20 & I-75) EVENING (FALL 2001)



This level-of-service rating represents the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 85 and 75 pcplpm with corresponding speed estimates of 20 to 25 mph.

These data are the affected by roadwork associated with the new HOV facility. While no lanes were closed, it appeared that pavement rehabilitation in the vicinity of Jimmy Carter Blvd significantly affected traffic flow along this section of I-85.

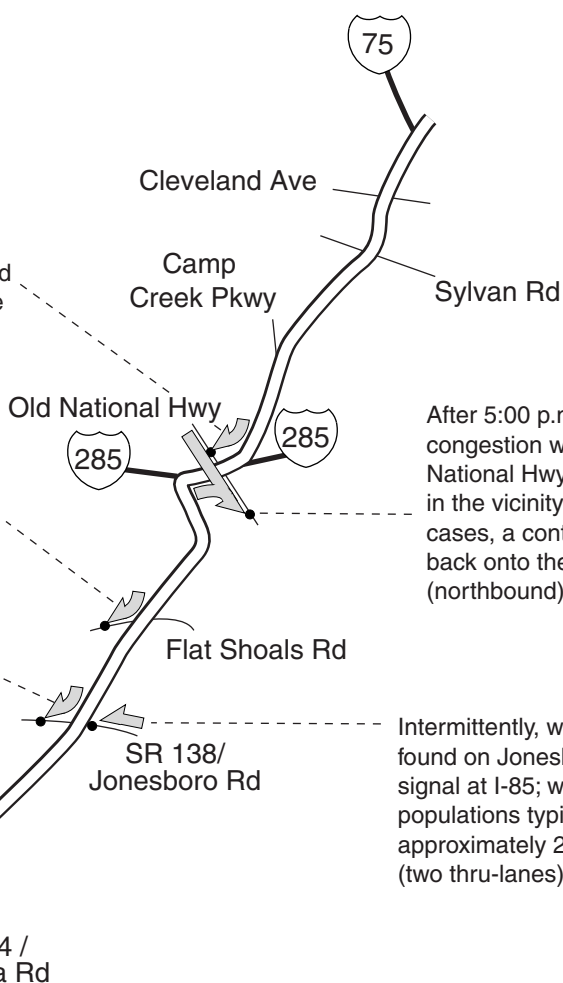


I-85 (Between I-75 and SR 74) EVENING (FALL 2001)

After 5:00 p.m., congestion was found on the southbound exit ramp at Old National Hwy; when congested, queue populations at the signal at the head of the ramp typically ranged from approximately 25 to 35 vehicles per lane (two left-turn lanes).

On some days but not others, congestion was found on the southbound exit ramp at Flat Shoals Rd; when congested, queue populations at the head of the ramp typically ranged from approximately 25 to 35 vehicles (left-turn lane only).



Intermittently, congestion was found on the southbound exit ramp at Jonesboro Rd; when congested, queue populations at the head of the ramp typically ranged from approximately 20 to 25 vehicles per lane (two left-turn lanes).



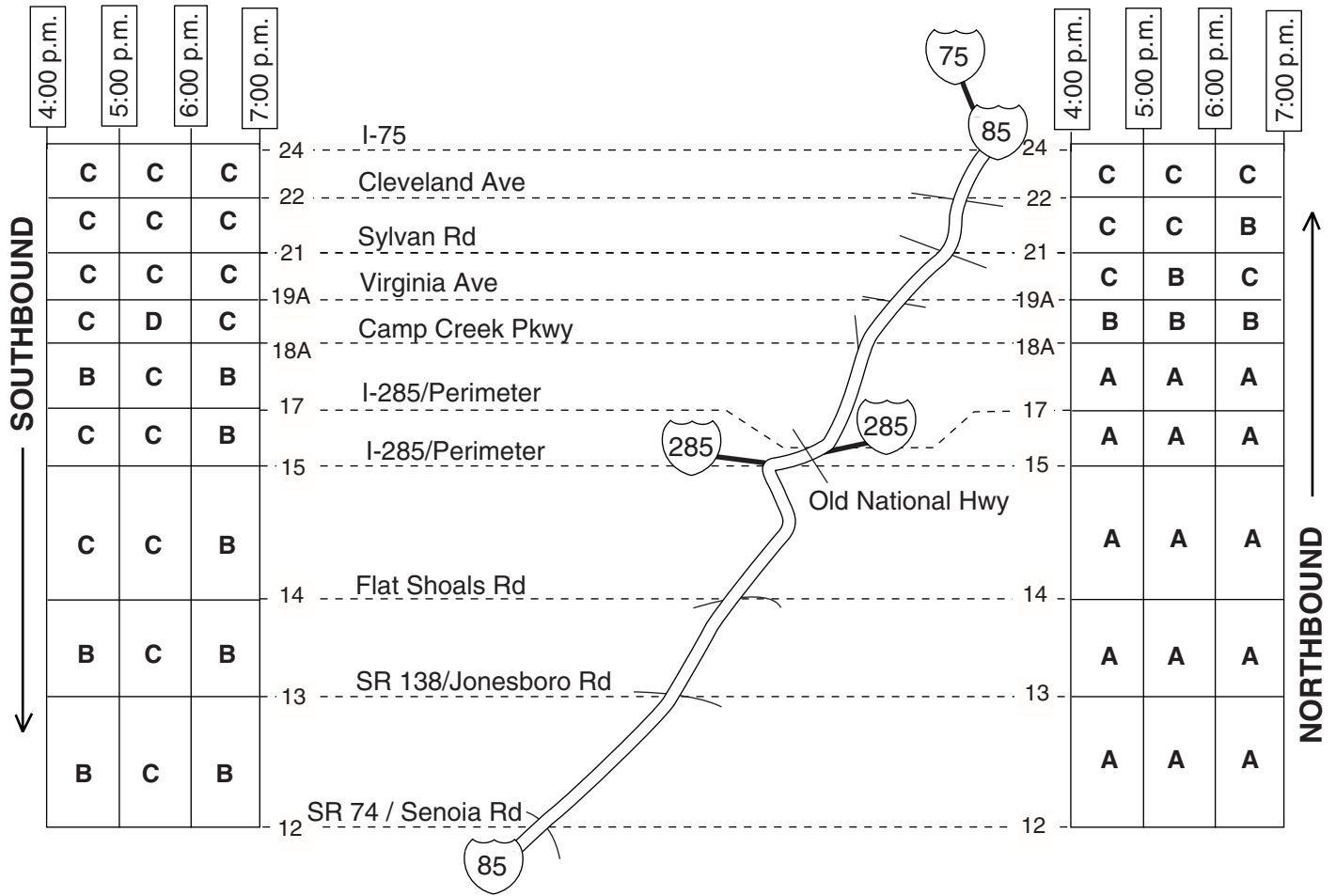
After 5:00 p.m., southbound congestion was found on Old National Hwy at the series of signals in the vicinity of I-85. In several cases, a continuous queue extended back onto the I-85 exit ramp (northbound).

Intermittently, westbound congestion was found on Jonesboro Rd approaching the signal at I-85; when congested, queue populations typically ranged from approximately 25 to 35 vehicles per lane (two thru-lanes).

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-85 (Between I-75 and SR 74) EVENING (FALL 1998)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F			
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									



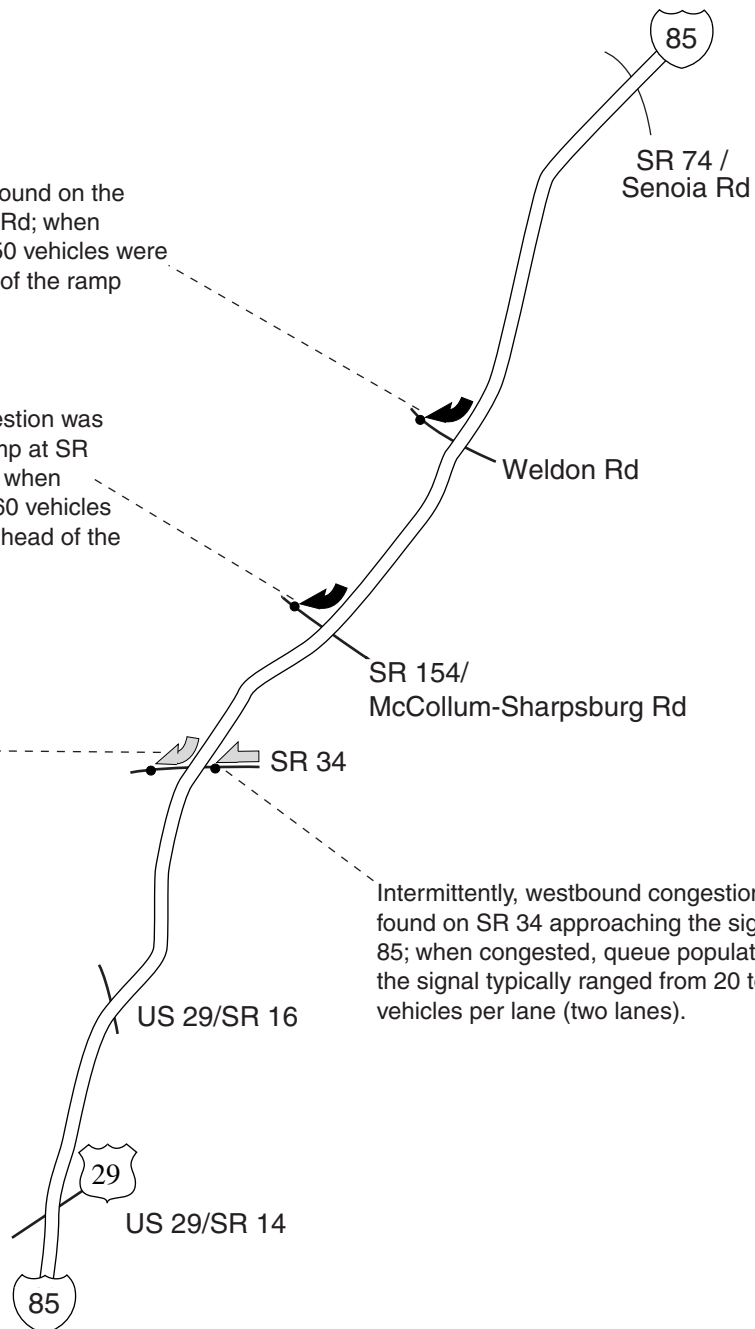
I-85 (Between SR 74 & US 29) EVENING (FALL 2001)

After 5:00 p.m., congestion was found on the southbound exit ramp at Weldon Rd; when congested, approximately 30 to 50 vehicles were queued at the signal at the head of the ramp (left-turn lane).



During most observations, congestion was found on the southbound exit ramp at SR 154 (McCollum-Sharpsburg Rd); when congested, approximately 30 to 60 vehicles were queued at the signal at the head of the ramp (left-turn lane).

Intermittently, congestion was found on the southbound exit ramp at SR 34; when congested, approximately 35 to 45 vehicles were queued at the signal at the head of the ramp (left-turn lane).

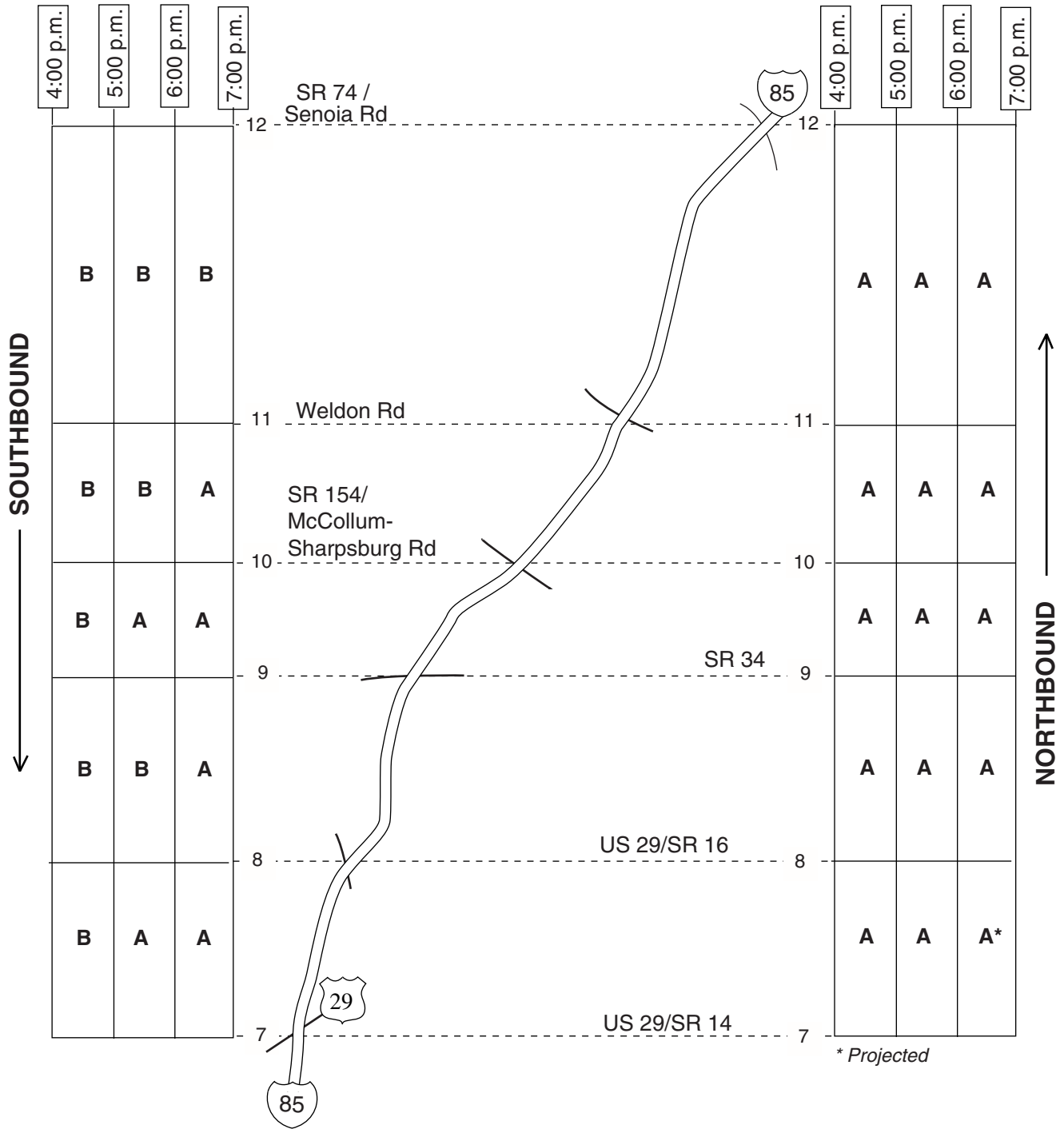
Intermittently, westbound congestion was found on SR 34 approaching the signal at I-85; when congested, queue populations at the signal typically ranged from 20 to 30 vehicles per lane (two lanes).



FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-85 (Between SR 74 & US 29) EVENING (FALL 1998)

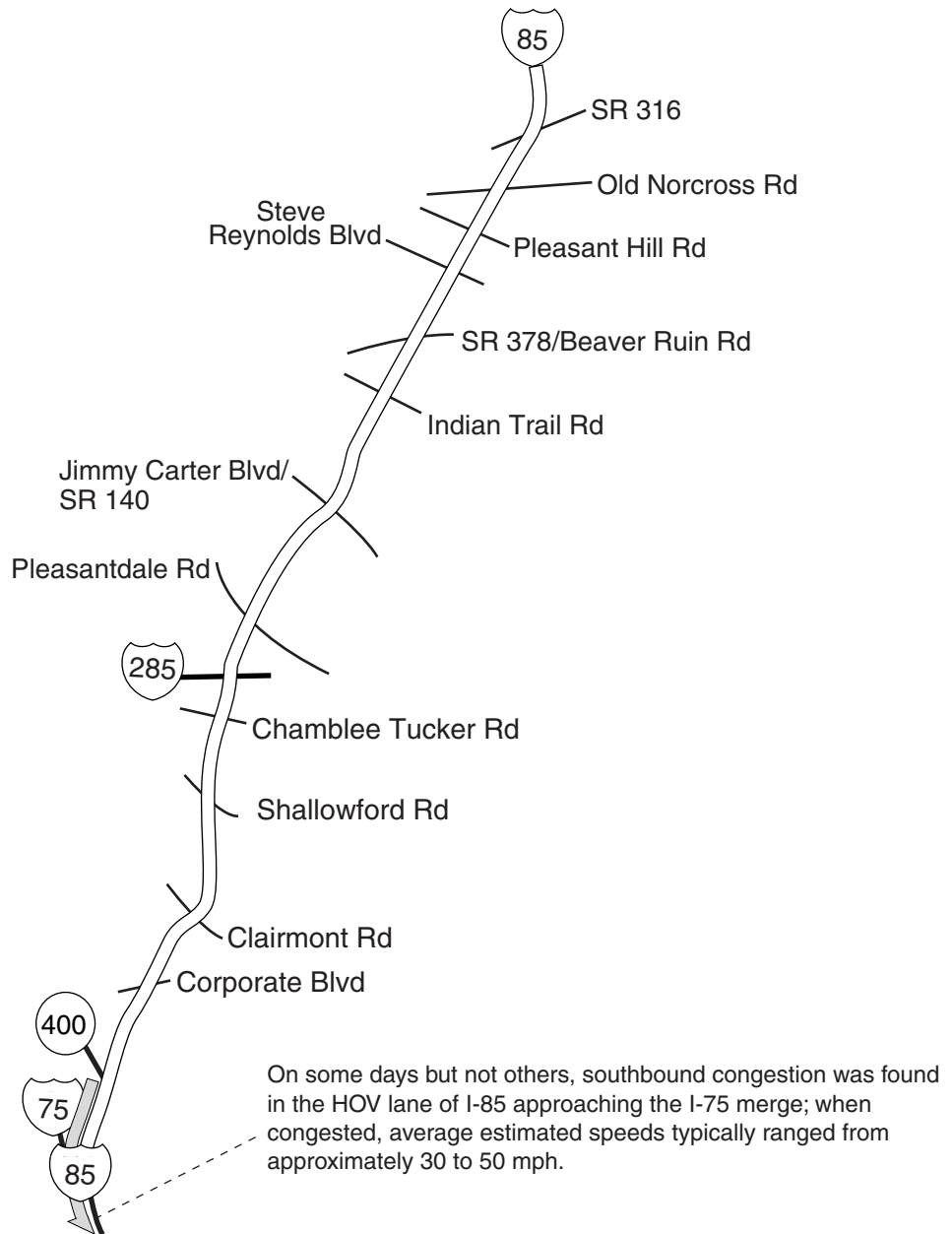


LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									

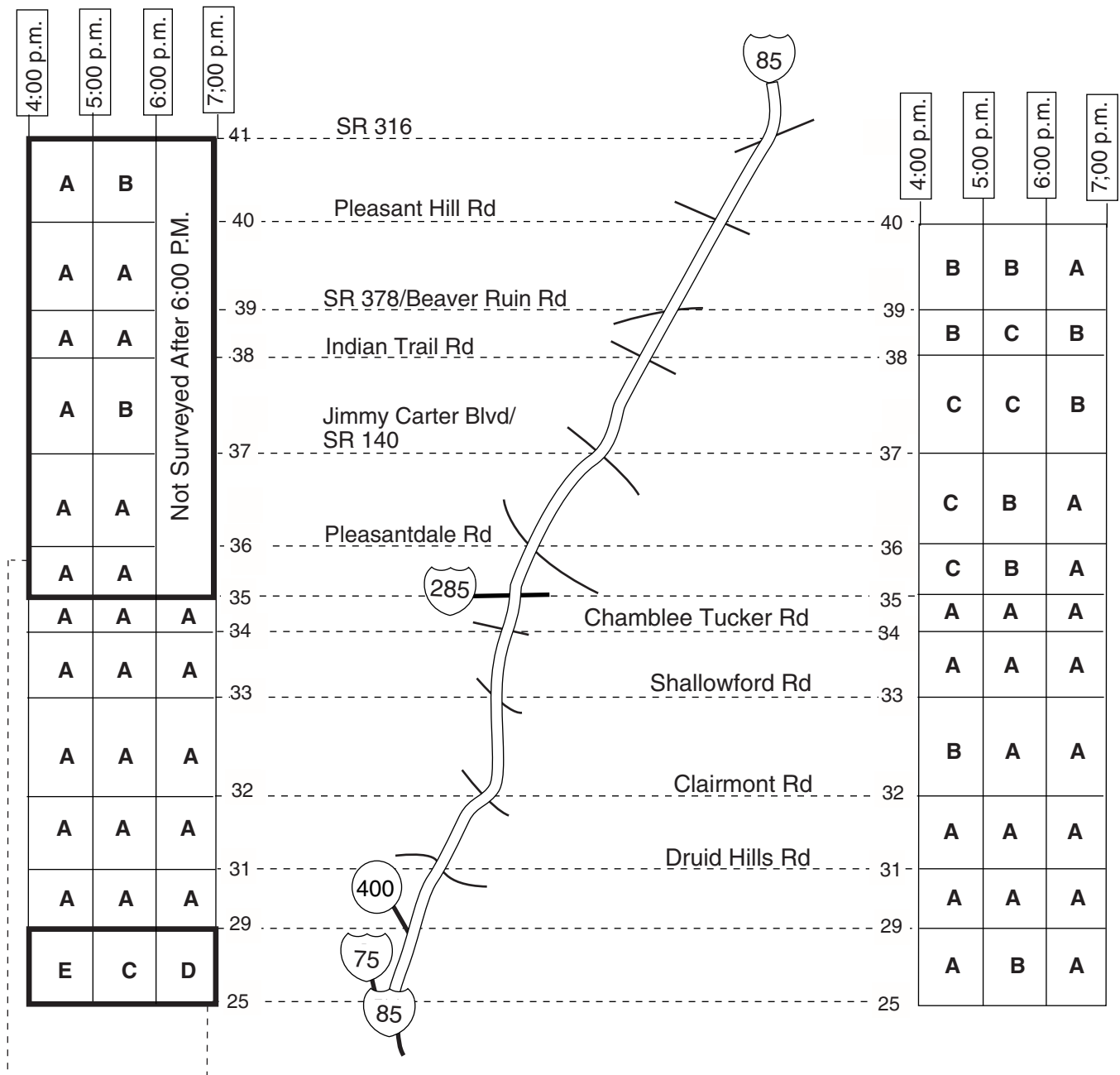


I-85 HOV EVENING (FALL 2001)





I-85 HOV EVENING (FALL 2001)

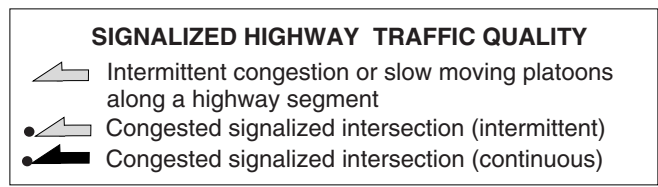
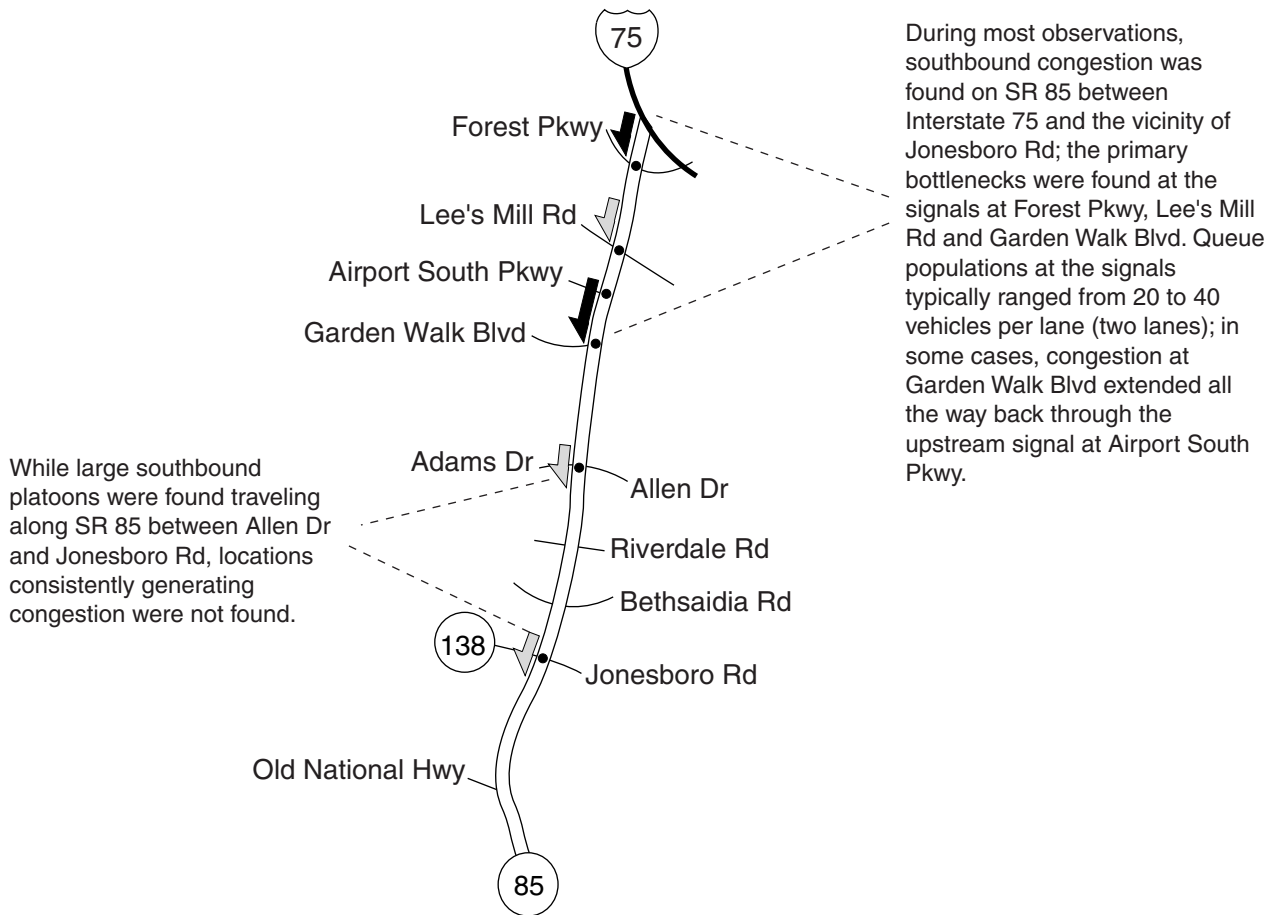


The southbound HOV lane between SR 316 and the Perimeter opened during the week of October 29, 2001. The level-of service data for this portion of the HOV facility is the result of only one survey flight (Wednesday, October 31, 2001).

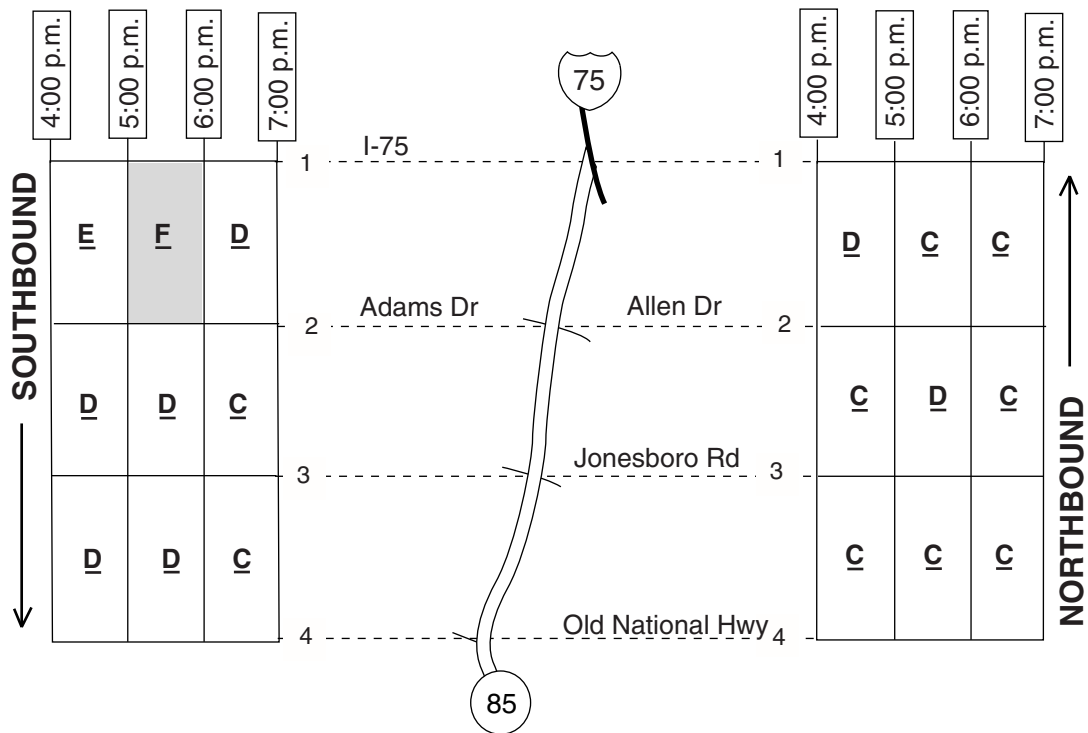
These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 65 and 55 pcplpm with corresponding speed estimates of 30 to 35 mph.



SR 85 (Clayton County) EVENING (FALL 2001)



**SR 85
(Clayton County)
EVENING (FALL 2001)**



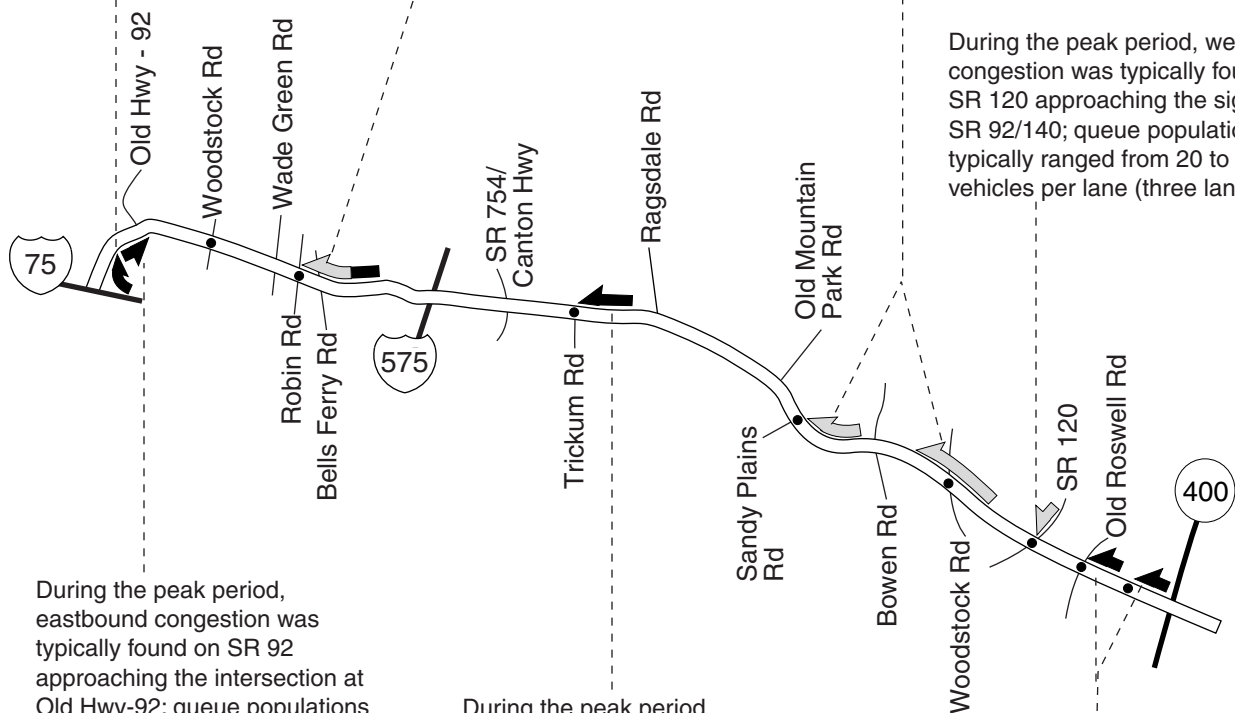


SR 92 (CROSSVILLE / WOODSTOCK /ALABAMA RD) (Cherokee / Fulton Co.) EVENING (FALL 2001)

During the peak period, congestion was typically found on the I-75 ramp at SR 92; queue populations ranged from approximately 20 to 30 vehicles (one lane).

Throughout the evening survey period, westbound congestion was found on SR 92 approaching the signal at Robin Rd. In some cases, congestion extended back through the upstream signal at Bells Ferry Rd. Queue populations ranged widely, from approximately 30 to 70 vehicles (one lane).

During most observations, large westbound platoons were typically found on SR 92 between SR 120 and Sandy Plains Rd; while no one signal appeared to consistently generate congestion, some delays were apparent approaching and through the signalized intersections at Woodstock Rd and Sandy Plains Rd.






During the peak period, westbound congestion was typically found on SR 120 approaching the signal at SR 92/140; queue populations typically ranged from 20 to 30 vehicles per lane (three lanes).

During the peak period, eastbound congestion was typically found on SR 92 approaching the intersection at Old Hwy-92; queue populations ranged from approximately 20 to 35 vehicles (one lane). Congestion appeared to be caused by vehicles waiting for gaps in westbound traffic before turning left onto Old Hwy-92.

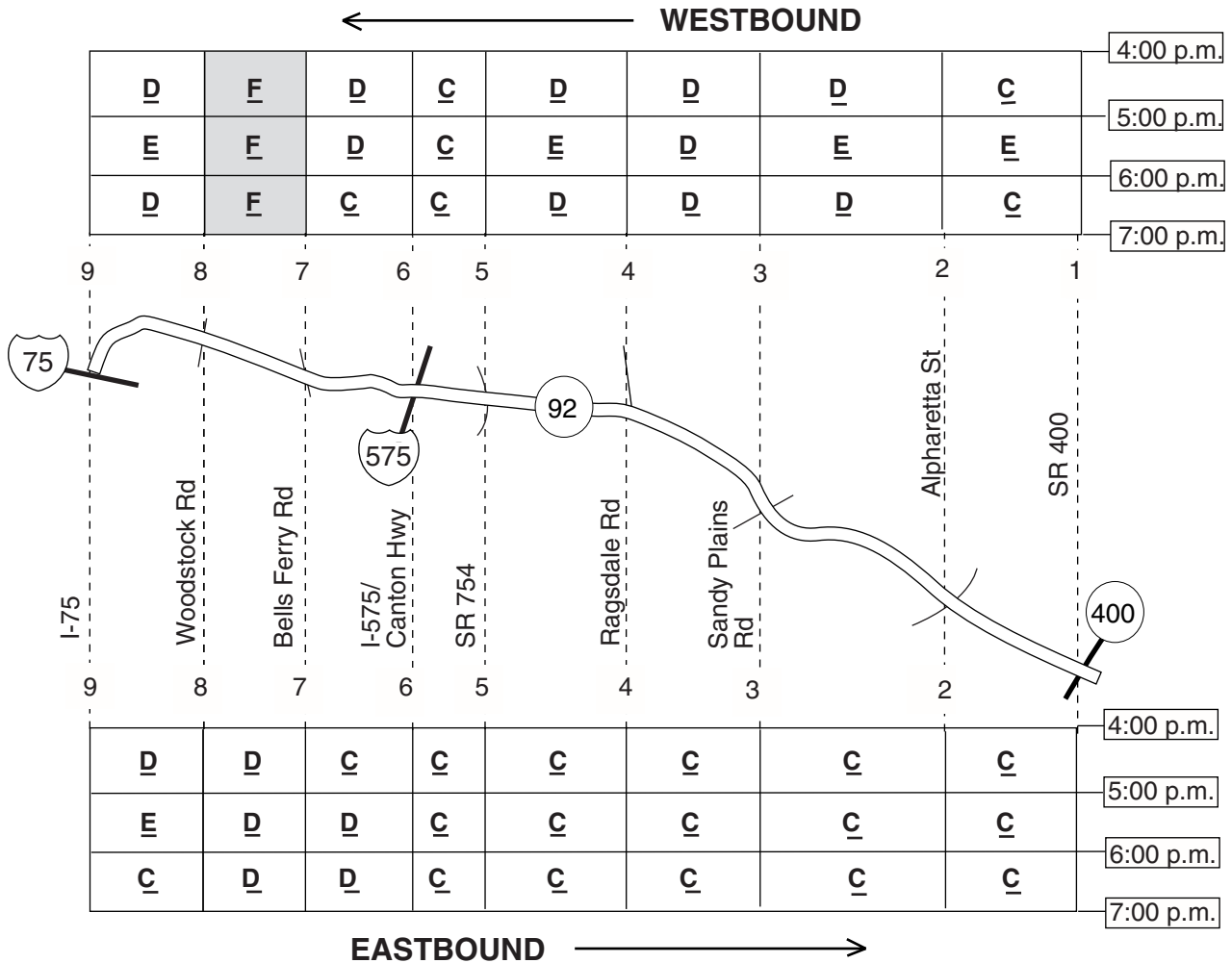
During the peak period, westbound congestion was typically found on SR 92 approaching the signal at Trickum Rd; queue populations ranged from approximately 20 to 30 vehicles per lane (two lanes).

After 5:00 p.m., westbound congestion was typically found on SR 92 between SR 400 and SR 120. The primary bottleneck appeared to be the signal at Old Roswell Rd; however, intermittent congestion was also found upstream at the series of closely spaced signals.

SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

**SR 92 (CROSSVILLE / WOODSTOCK / ALABAMA RD)
(Cherokee / Fulton Co.)
EVENING (FALL 2001)**



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>

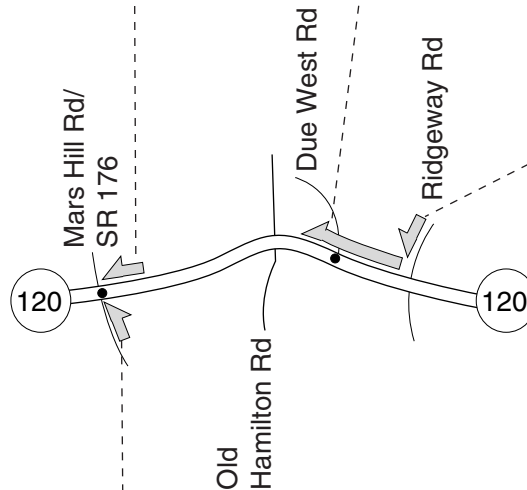


DALLAS HWY (SR 120) (Cobb County) EVENING (FALL 2001)

Intermittently, westbound congestion was typically found on SR 120 (Dallas Hwy) approaching the signal at SR 176 (Mars Hill Rd); when congested, queue populations ranged from approximately 20 to 40 vehicles per lane (two lanes).




During most observations, large westbound platoons (25 to 35 vehicles per lane; two lanes) were found on Dallas Hwy traveling through the signal at Due West Rd; while significant queuing was not found at the signal, it appeared that some delays were incurred by westbound travelers along this section of Dallas Hwy.

Intermittently, southbound congestion was found on Ridgeway Rd approaching the signal at Dallas Hwy; when congested, queue populations ranged from approximately 20 to 30 vehicles per lane (two lanes).

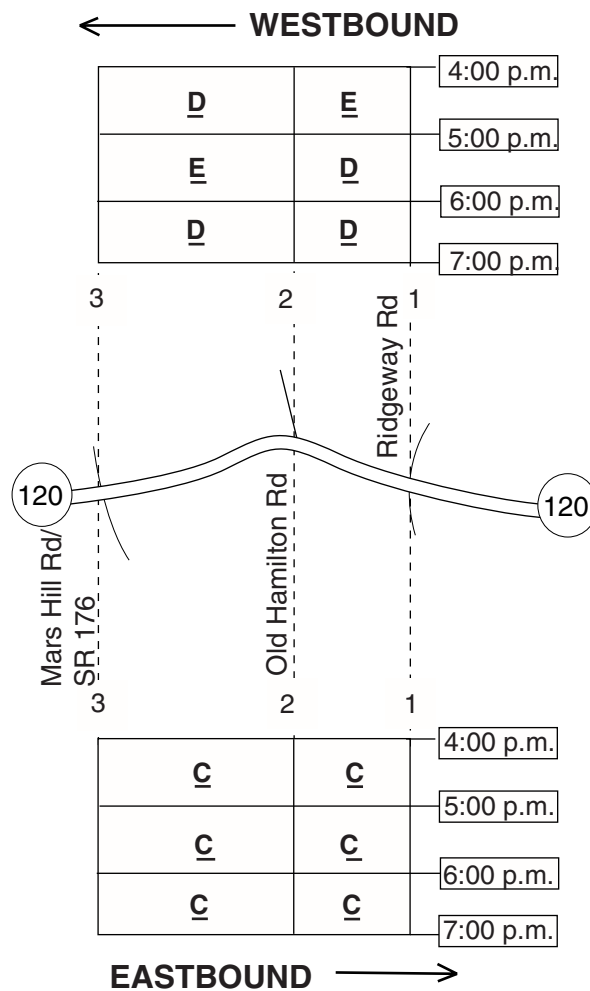


Intermittently, northbound congestion was found on SR 176 approaching the signal at SR 120 (Dallas Hwy); when congested, queue populations ranged from approximately 20 to 30 vehicles (one lane).

SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

DALLAS RD (SR 120)
(Cobb County)
EVENING (FALL 2001)



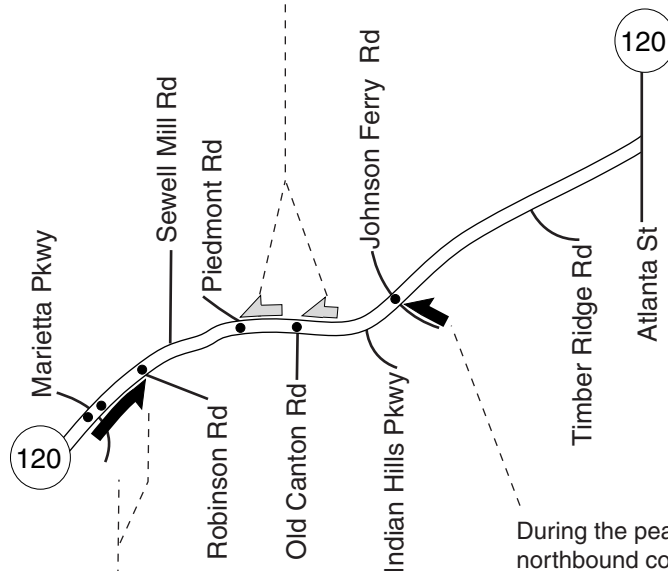
SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>



ROSWELL RD (SR 120) (Cobb County) EVENING (FALL 2001)




During the peak period, westbound congestion was typically found on Roswell Rd approaching the signals at Old Canton Rd and Piedmont Rd; queue populations typically ranged from 20 to 40 vehicles per lane (two lanes).



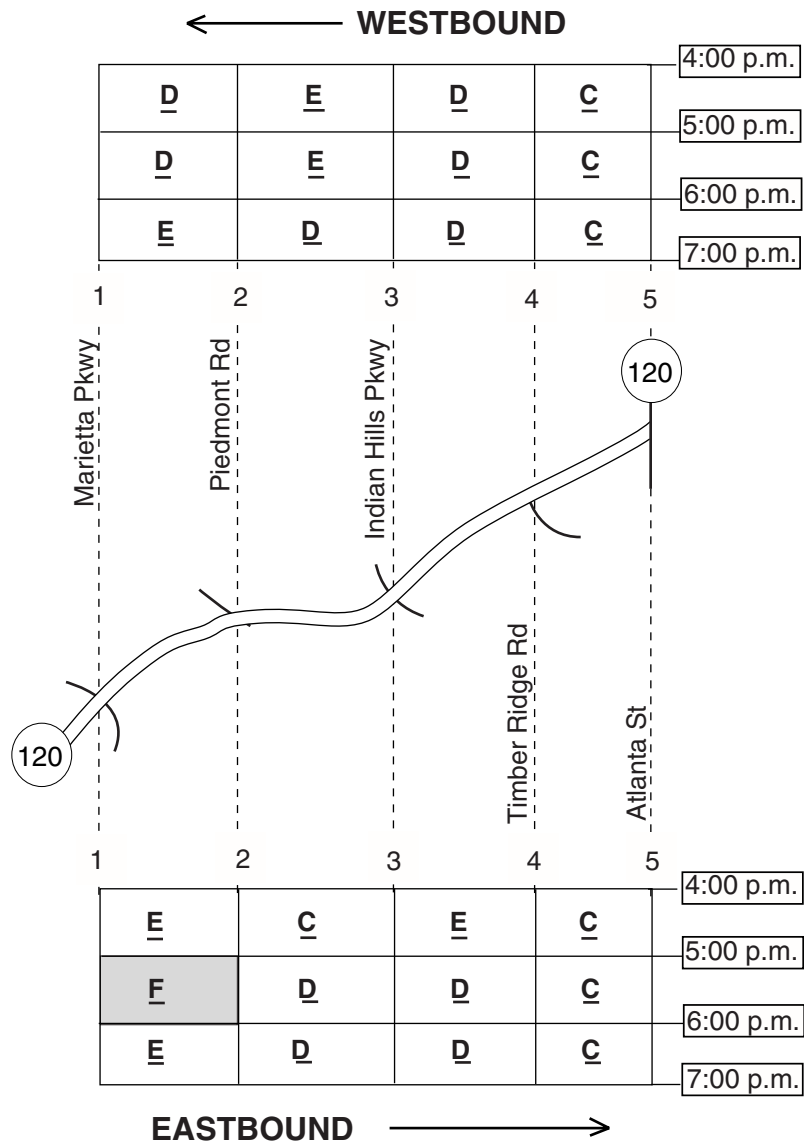
During most observations, eastbound congestion was found on Roswell Rd (SR 120) approaching the signal at Robinson Rd; in some cases, a continuous queue extended all the way back through the signals at the Marietta Pkwy Interchange (a distance of approximately one mile).

During the peak period, northbound congestion was typically found on Johnson Ferry Rd approaching the signal at Roswell Rd; queue populations ranged widely, from approximately 20 to 50 vehicles per lane (three lanes).

SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

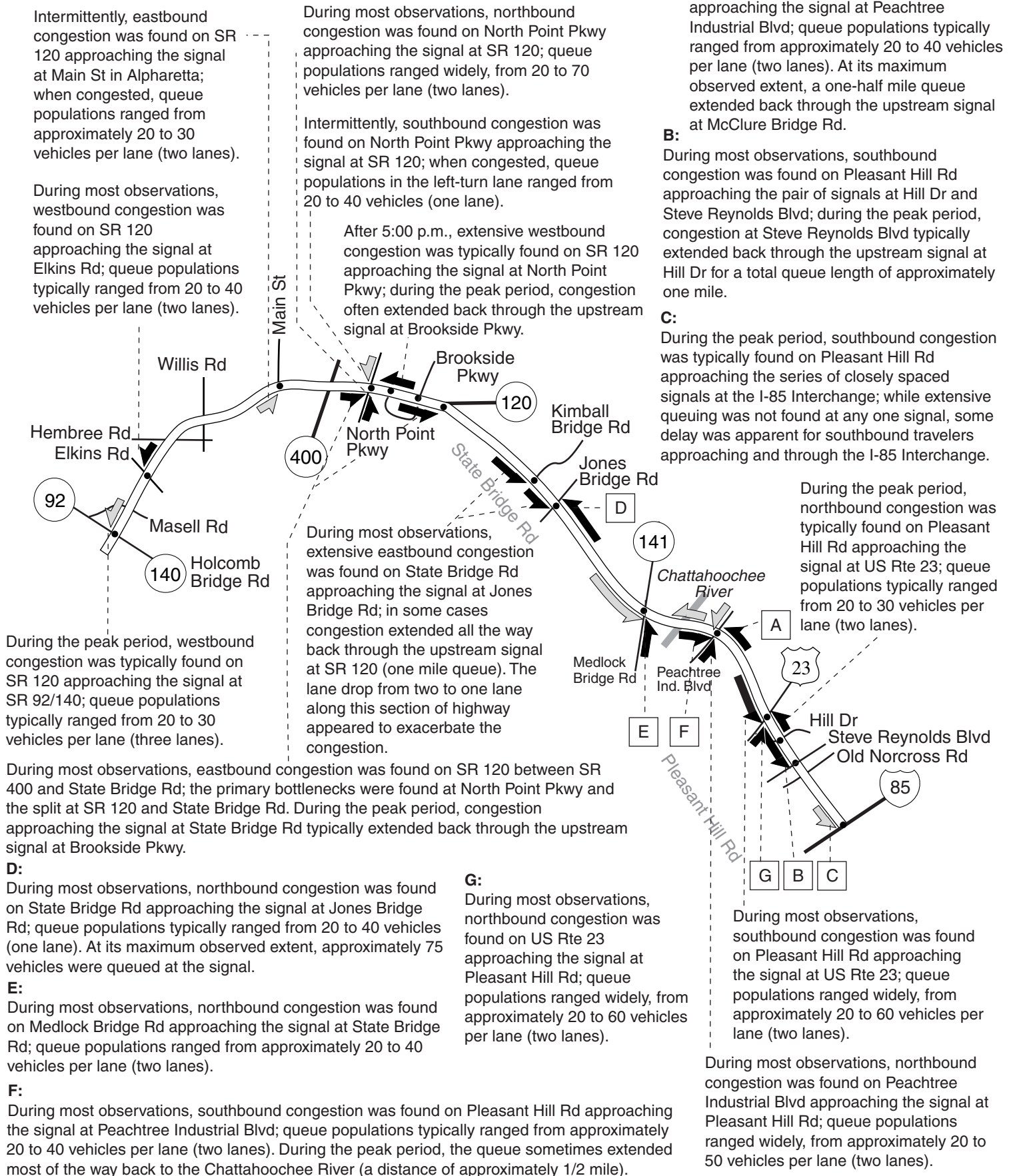
ROSWELL RD (SR 120)
(Cobb County)
EVENING (FALL 2001)



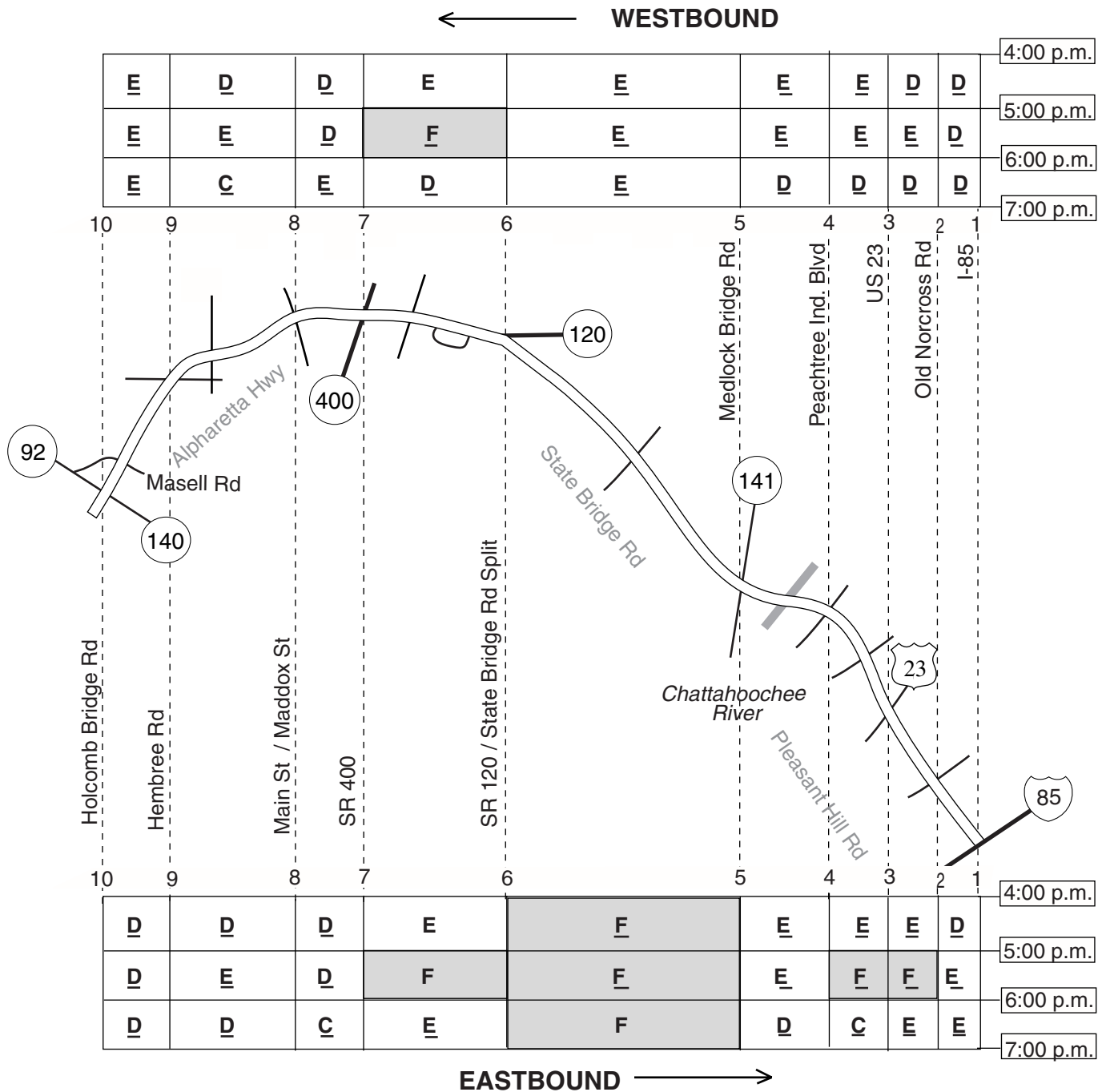
SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>

SR 120 / STATE BRIDGE / PLEASANT HILL RD (Fulton / Gwinnett Co.) EVENING (FALL 2001)

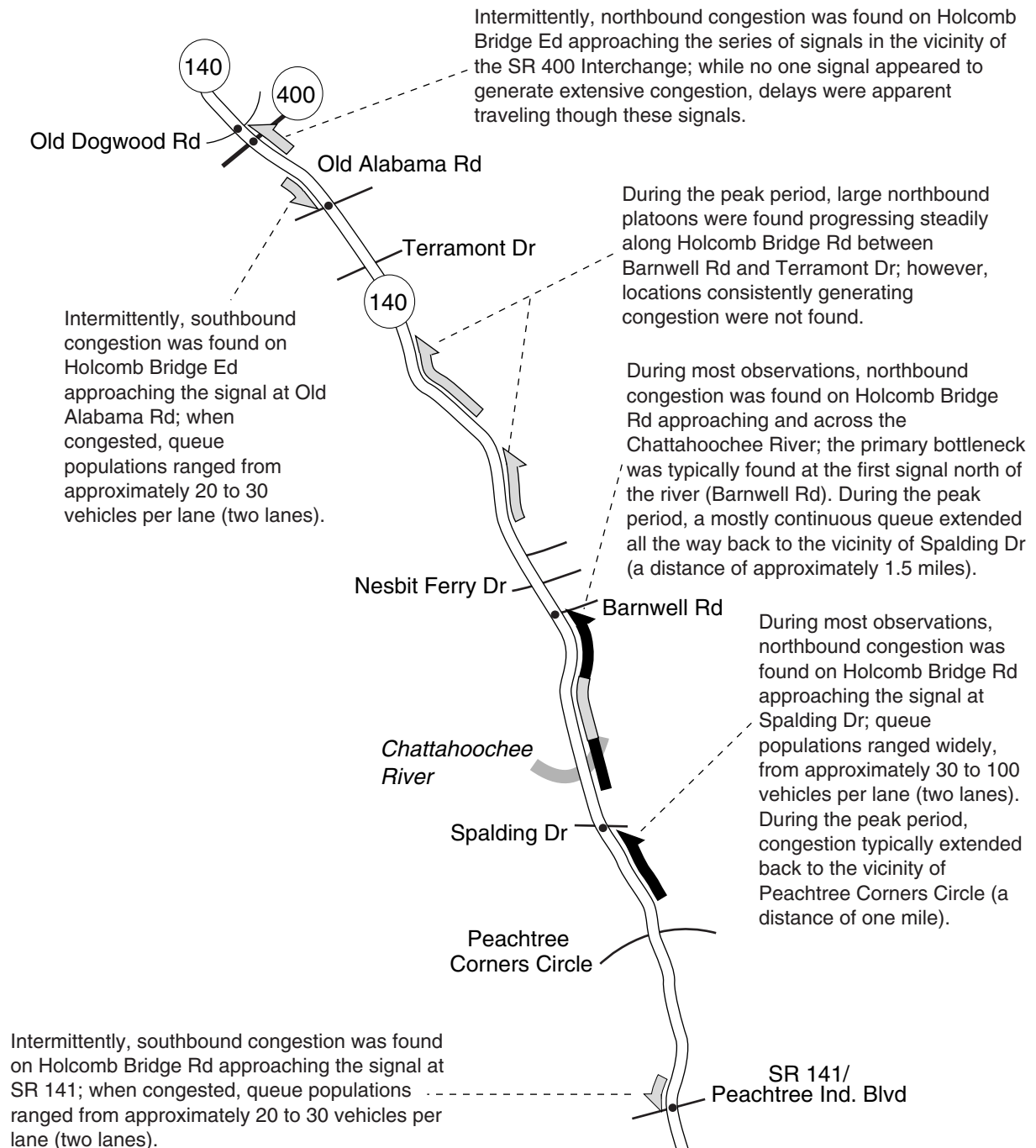


SR 120 / STATE BRIDGE / PLEASANT HILL RD
(Fulton / Gwinnett Co.)
EVENING (FALL 2001)








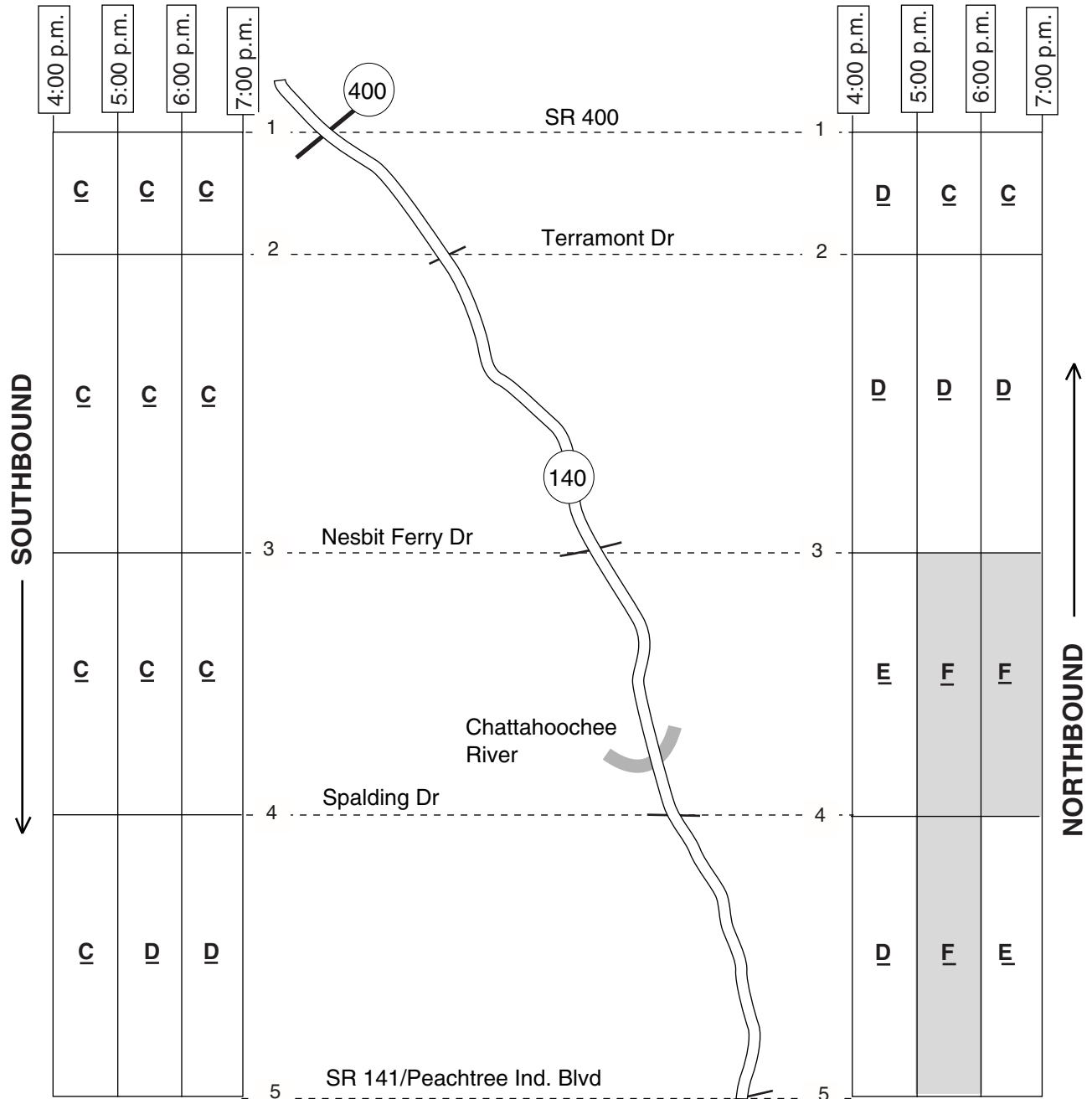
HOLCOMB BRIDGE RD (SR 140) (Gwinnett / Fulton Co.) EVENING (FALL 2001)



SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

HOLCOMB BRIDGE RD (SR 140) **(Gwinnett / Fulton Co.)** **EVENING (FALL 2001)**



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F



SR 141 (Peachtree Industrial Blvd / Peachtree Pkwy / Medlock Bridge Rd) (Fulton / Gwinnett / Dekalb Co.) EVENING (FALL 2001)

Intermittently, southbound congestion was found on SR 141 approaching the signal at Old Alabama Rd; when congested, queue populations ranged from approximately 20 to 25 vehicles per lane (two lanes).

Intermittently, eastbound congestion was found on Old Alabama Rd approaching the signal at SR 141; when congested, queue populations ranged from approximately 20 to 30 vehicles (one lane)

During the peak period, eastbound congestion was typically found on Spalding Dr approaching the signal at SR 141; queue populations ranged from approximately 20 to 40 vehicles (one thru-lane).

Intermittently, southbound congestion was found on SR 141 approaching the signal at Technology Pkwy; when congested, queue populations ranged from approximately 20 to 25 vehicles per lane (two lanes).

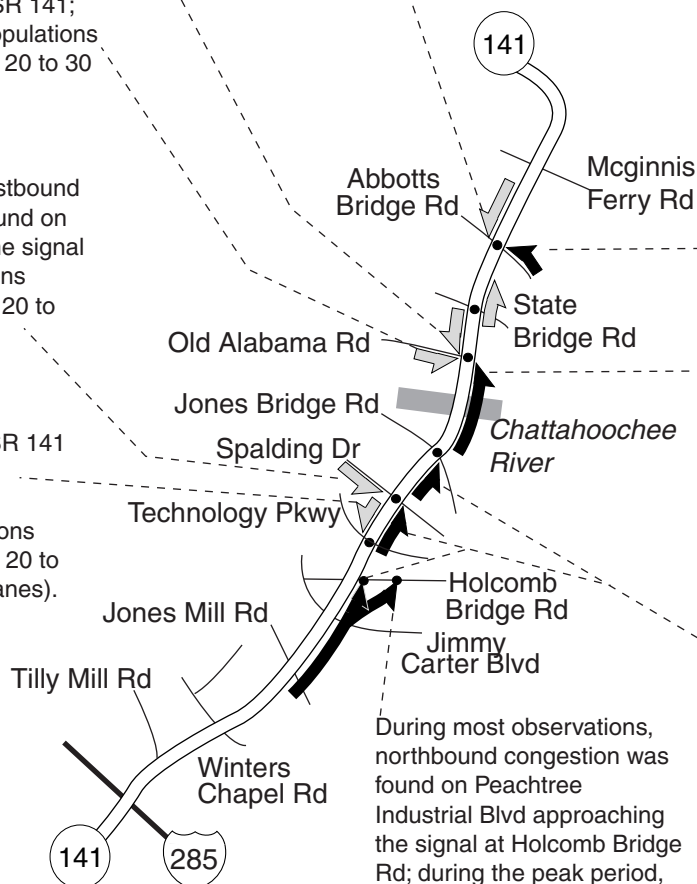
Intermittently, southbound congestion was found on SR 141 approaching the signal at Abbotts Bridge Rd; when congested, queue populations ranged from approximately 20 to 30 vehicles per lane (two lanes). The left lane queue typically contained more vehicles as congestion in the left-turn bay sometimes extended back into the mainline.

During most observations, northbound congestion was found on Abbotts Bridge Rd (SR 120) approaching the signal at SR 141; queue populations ranged widely, from approximately 20 to 65 vehicles (one lane). Ongoing construction appeared to cause or exacerbate the congestion.




Throughout the evening survey period, northbound congestion was found on SR 141 approaching the signal at Old Alabama Rd; during the peak period, congestion typically extended back across the Chattahoochee River for a distance of approximately one to two miles. Extended delays were apparent for northbound travelers crossing the river along this corridor.

During most observations, northbound congestion was found on SR 141 between the terminus of the freeway section (at Jimmy Carter Blvd) and the Chattahoochee River; the primary bottlenecks were located at the signals at Holcomb Bridge Rd, Spalding Dr and Jones Bridge Rd. Queue populations ranged widely, from approximately 25 to 40 vehicles per lane (two lanes).

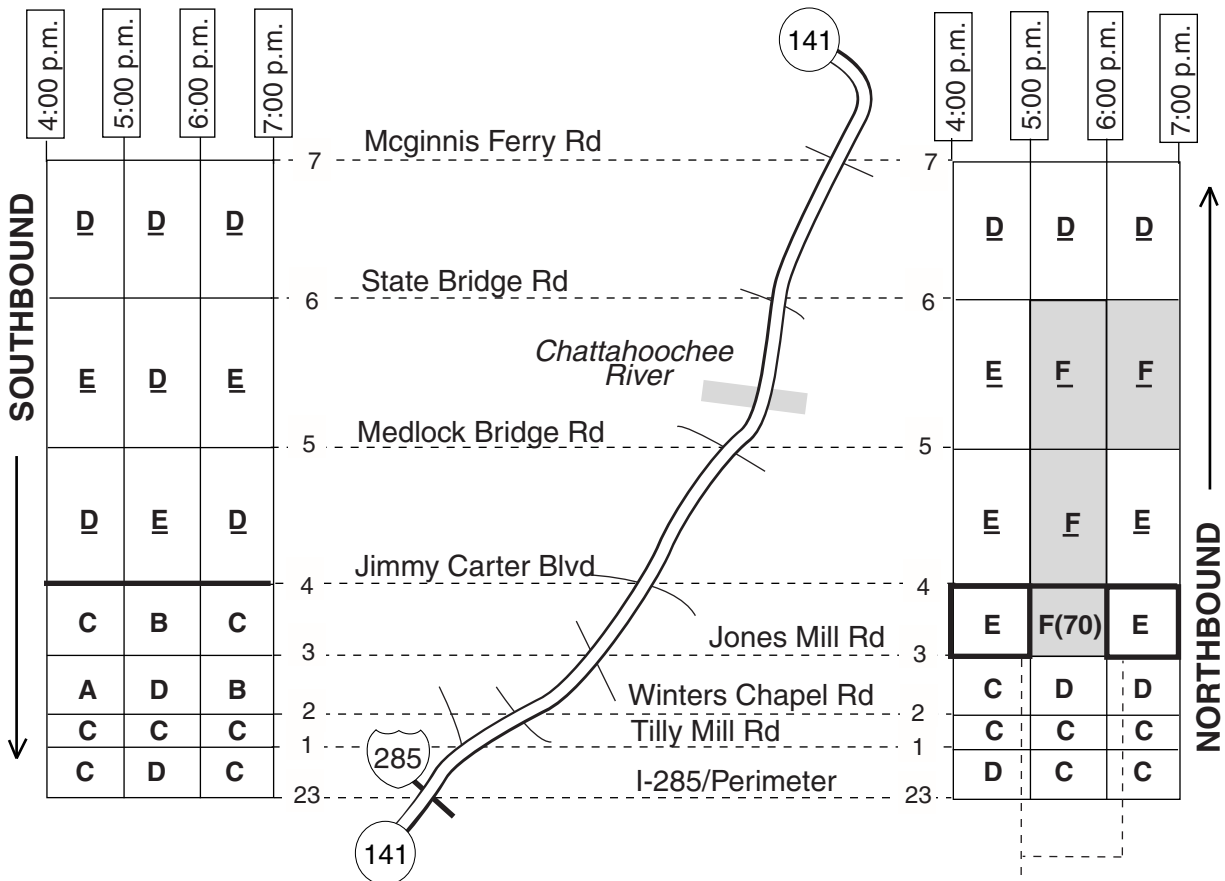
During most observations, northbound congestion was found on Peachtree Industrial Blvd approaching the signal at Holcomb Bridge Rd; during the peak period, congestion typically extended back to the vicinity of Jones Mill Rd (a distance of approx. one mile). It appeared congestion on Peachtree Industrial Blvd persisted north of Holcomb Bridge Rd (out of survey area).



SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

**SR 141 (Peachtree Industrial Blvd / Peachtree Pkwy / Medlock Bridge Rd)
(Fulton / Gwinnett / Dekalb Co.)
EVENING (FALL 2001)**



These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 70 and 50 pcplpm with corresponding speed estimates of 25 to 40 mph.

LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE
A	B	C	D	E	F			F
0	10	20	30	45	65			
Density scale (cars per lane-mile)								
Note: F (60) in the tables means level-of-service "F", with density = 60								

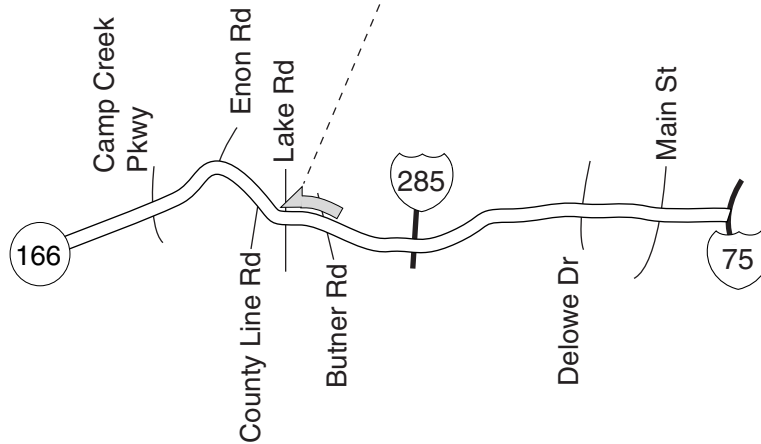
SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED	
A	B	C	D	E		F	






CAMPBELLTON RD / LAKEWOOD FWY (SR 166)
(Fulton County)
EVENING (FALL 2001)

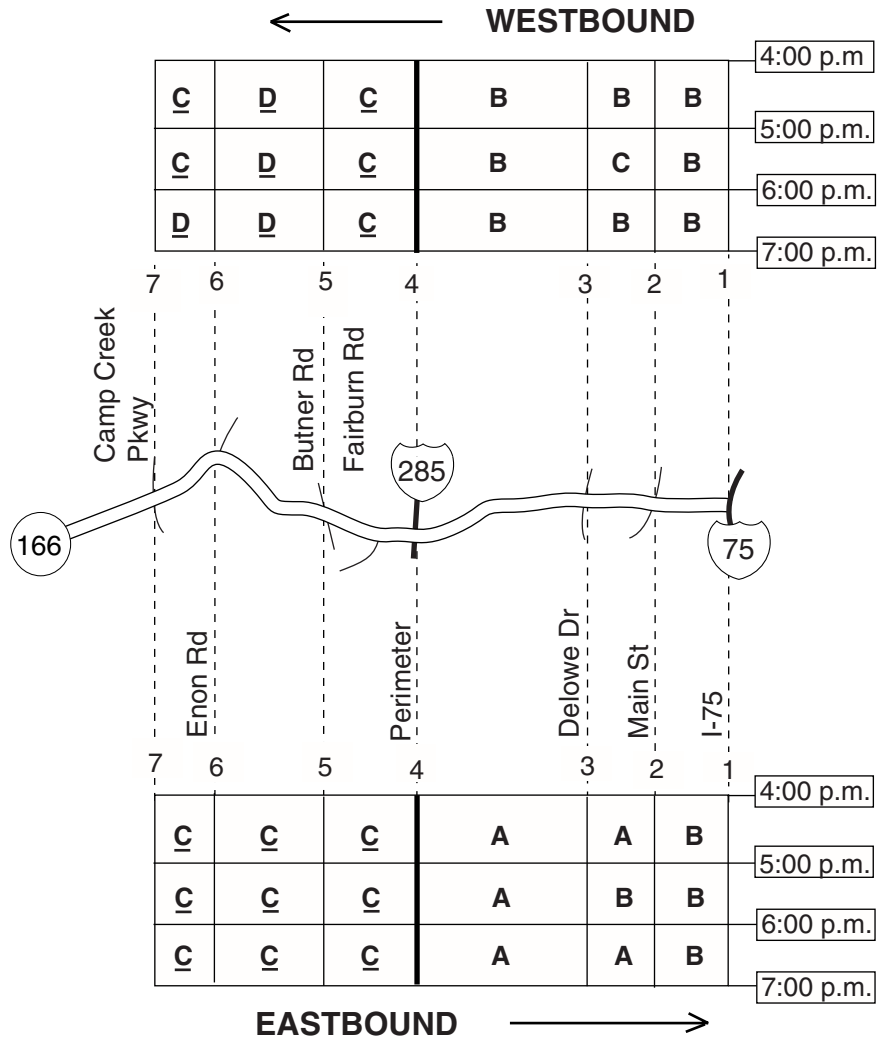
Intermittently, large westbound platoons were found traveling along SR 166 where the roadway narrows to one lane; vehicles appeared to progress steadily without major delay.



SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

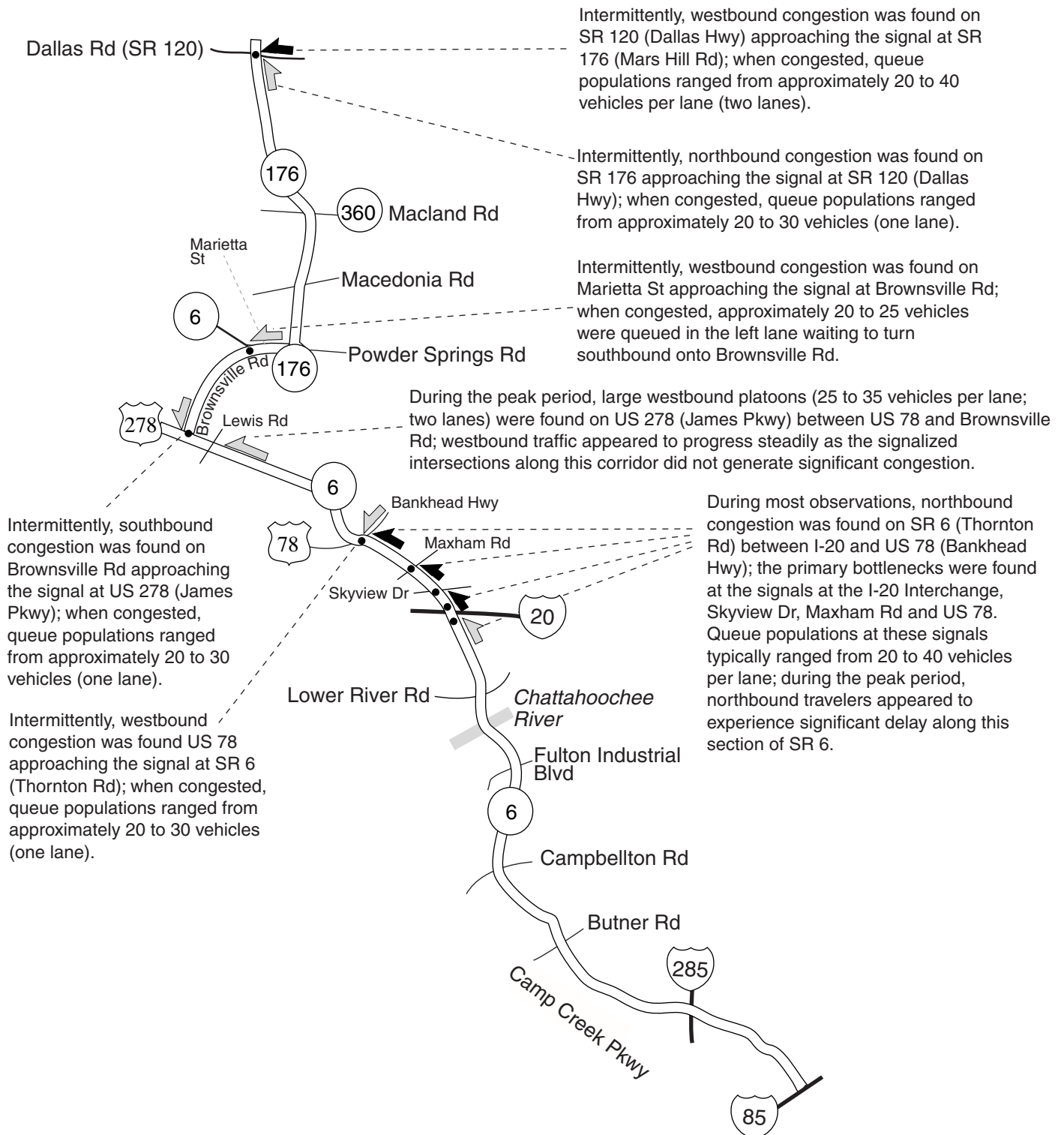
CAMPBELLTON RD / LAKEWOOD FWY (SR 166)
(Fulton County)
EVENING (FALL 2001)



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>

SR 176 / BROWNSVILLE RD / SR 6 / CAMP CREEK PKWY **(Cobb / Douglas / Fulton Co.)** **EVENING (FALL 2001)**



EVENING (FALL 2001)

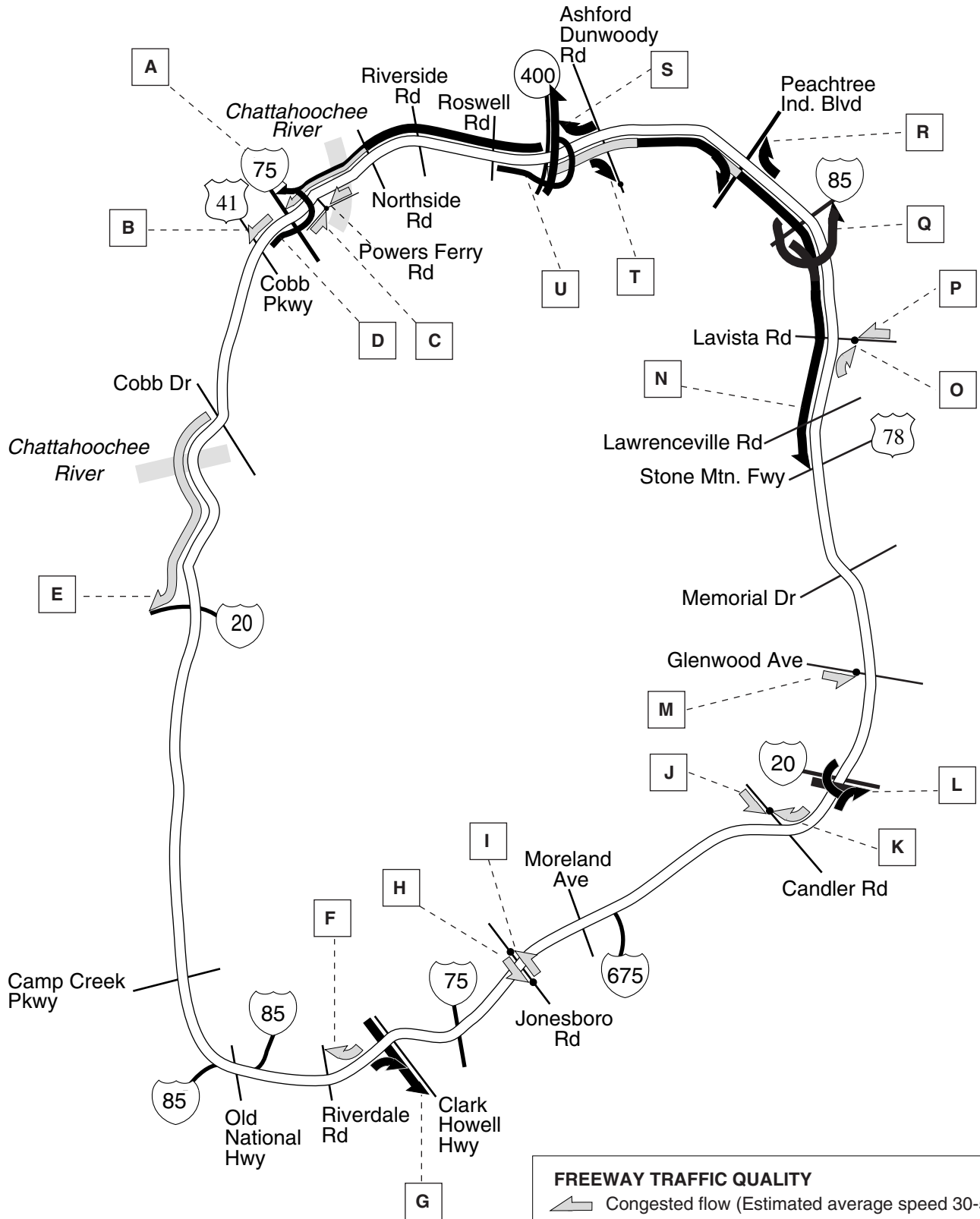


NORTHBOUND

SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>

PERIMETER (I-285) EVENING (FALL 2001)



PERIMETER (I-285)

EVENING (FALL 2001)

A: During the peak period, an extended zone of westbound congestion was found on the Perimeter between SR 400 and I-75; average estimated speeds typically ranged from approximately 25 to 40 mph. Congestion appeared to be caused or exacerbated by the weaving associated with the I-75 Interchange.

B: During the peak period, a short zone of southbound congestion was found on the Perimeter between I-75 and Cobb Pkwy; average estimated speeds typically ranged between 35 and 45 mph. Congestion appeared to be caused by traffic entering at the closely spaced interchanges at I-75 and Cobb Pkwy.

C: During the peak period, congestion was found in both directions on Powers Ferry Rd/Akers Mill Rd approaching the signal at Powers Ferry Rd; when congested, queue populations at the signal typically ranged from approximately 20 to 30 vehicles (one thru-lane).

D: On some days but not others, congestion was found on the exit ramp to I-75 (northbound); when congested, the queue typically extended back into the right two lanes of the Perimeter. Northbound travelers in the two left lanes of the Perimeter typically were able to bypass the congestion.

E: During the peak period, southbound congestion was found on the Perimeter between Cobb Dr and I-20; average estimated speeds typically ranged from approximately 30 to 50 mph. Congestion appeared to be caused or exacerbated by the weaving associated with vehicles exiting at the I-20 interchange.

F: During the peak period, congestion was found on the exit ramp at Riverdale Rd; when congested, approximately 20 to 25 vehicles per lane were queued at the signal at the head of the ramp (two left-turn lanes).

G: During the peak period, congestion was found on the exit ramp at Clark Howell Hwy (southbound); the head of the queue was typically found downstream on Clark Howell Hwy.

H: Intermittently, southbound congestion was found on Jonesboro Rd approaching the signal at the Perimeter; when congested, approximately 35 to 40 vehicles were queued at the signal (left-turn lane).

I: Intermittently, northbound congestion was found on Jonesboro Rd approaching the signal at the Perimeter; when congested, approximately 30 to 35 vehicles were queued at the signal at the head of the ramp (left-turn lane).

J: Intermittently, southbound congestion was found on Candler Rd approaching the signal at the Perimeter; when congested, approximately 20 to 25 vehicles per lane were queued at the signal (two lanes).

K: Intermittently, congestion was found on the westbound exit ramp at Candler Rd; when congested, approximately 20 to 40 vehicles were queued at the signal at the head of the ramp (left-turn lane).

L: During the peak period, congestion was found on the Perimeter exit ramps at I-20 (eastbound); congestion appeared to be caused or exacerbated by the merge into congested flow on I-20.

M: Intermittently, eastbound congestion was found on Glenwood Ave approaching the signal at the Perimeter; when congested, approximately 20 to 25 vehicles per lane were queued at the signal (two lanes).

N: During the peak period, an extended zone of eastbound/southbound congestion was found on the Perimeter between SR 400 and Stone Mountain Freeway (US 78); the two primary bottlenecks were found at the I-85 Interchange and the lane drop (5 lanes to 4) at the Lawrenceville Rd Interchange. Often, eastbound congestion in the right lanes of the Perimeter was particularly severe for several miles on the approach to the I-85 Interchange (thru-traffic in the left lanes were typically less congested). South of I-85, congestion appeared consistent across all lanes on the approach to Stone Mountain Freeway; during the peak period, average speeds here typically ranged from 15 to 30 mph.

O: One day only, congestion was found on the northbound exit ramp at Lavista Rd; approximately 20 to 25 vehicles were queued in the right-turn lane at the head of the ramp.

P: One day only, westbound congestion was found on Lavista Rd approaching the signal at the Perimeter; approximately 25 to 30 vehicles were queued at the signal (left-turn lane).

Q: During the peak period, congestion was found on the exit ramp at I-85 (northbound); at its maximum observed extent, the ramp was completely filled with queued vehicles.

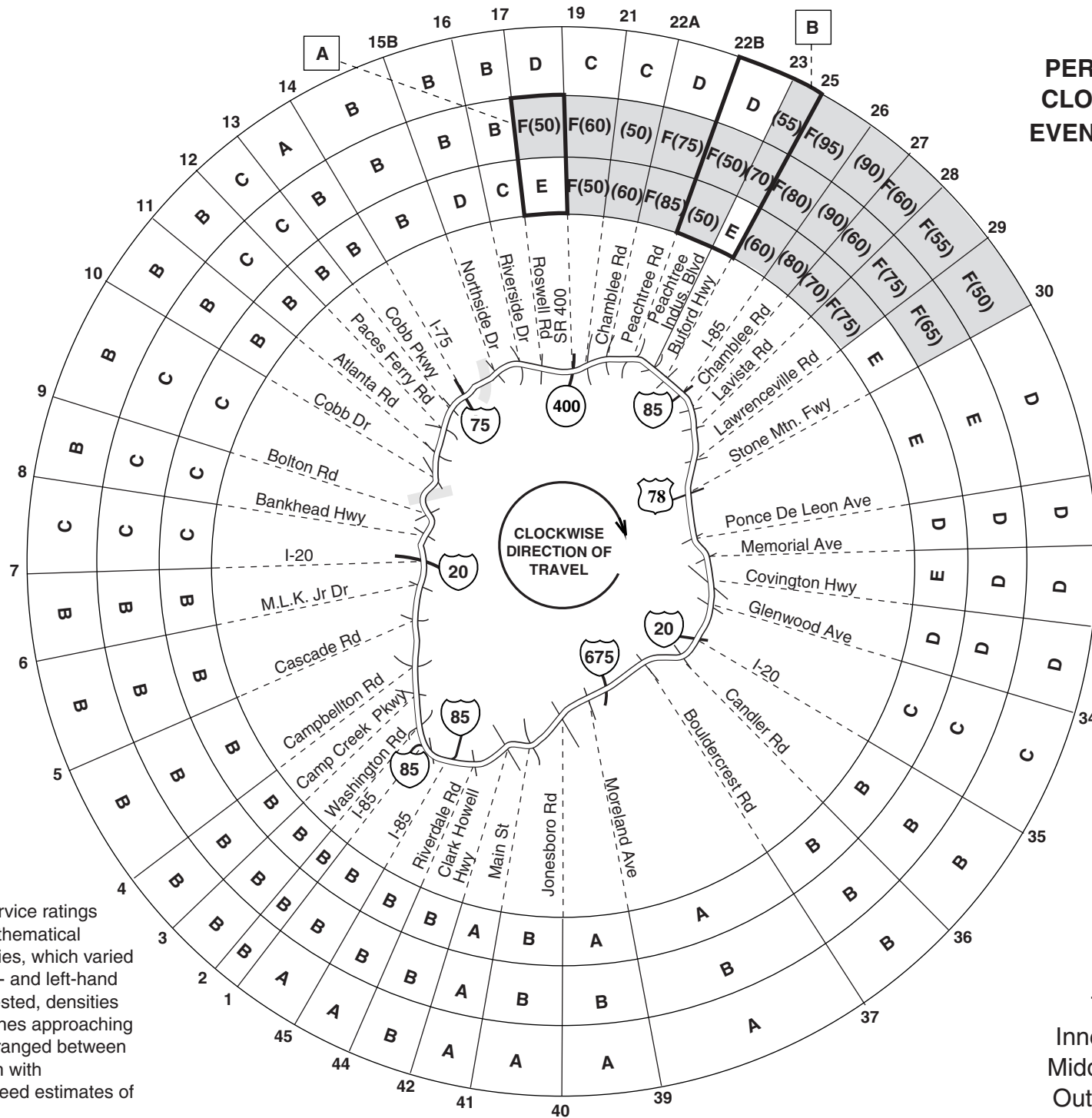
R: During the peak period, congestion was found on the northbound exit ramp at Peachtree Industrial Blvd; the tail of the queue typically extended back into the right lane of the Perimeter (thru-traffic on the Perimeter appeared to be able to bypass the queue). At its maximum observed extent, the tail of the queue was found in the vicinity of New Peachtree Rd (a distance of approx. 1/2 mile).

S: During the peak period, congestion was found on the westbound exit ramp at SR 400; when congested, the queue typically extended back into the right lane of the Perimeter (thru-traffic on the Perimeter appeared to be able to bypass the queue). At its maximum observed extent, the tail of the queue extended back onto the entrance ramp at Ashford-Dunwoody Rd (a distance of approx. one mile).

T: After 5:30 p.m., congestion was found on the eastbound exit ramp at Ashford-Dunwoody Rd; when congested, approximately 20 to 40 vehicles per lane were queued at the signal at the head of the ramp (two left-turn lanes).

U: During the peak period, congestion was found on the eastbound exit ramp at SR 400; when congested, the queue typically extended back into the right lane of the Perimeter. The tail of the queue was typically found in the vicinity of Roswell Rd (a distance of approx. one mile). Traffic in the left lanes of the Perimeter typically could bypass the queue without delay.

**PERIMETER (I-285)
CLOCKWISE FLOW
EVENING (FALL 2001)**



A:
 These level-of-service ratings represent the mathematical average of densities, which varied between the right- and left-hand lane; when congested, densities in the right two lanes approaching SR 400 typically ranged between 75 and 55 pcplpm with corresponding speed estimates of 25 to 35 mph.

B:
 These level-of-service ratings represent the mathematical average of densities, which varied between the right- and left-hand lane; when congested, densities in the right two lanes approaching I-85 typically ranged between 90 and 70 pcplpm with corresponding speed estimates of 15 to 25 mph.

B: These level-of-service ratings represent the mathematical average of densities, which varied between the right- and left-hand lane; when congested, densities in the right three lanes approaching I-75 typically ranged between 75 and 55 pcplpm with corresponding speed estimates of 25 to 35 mph.

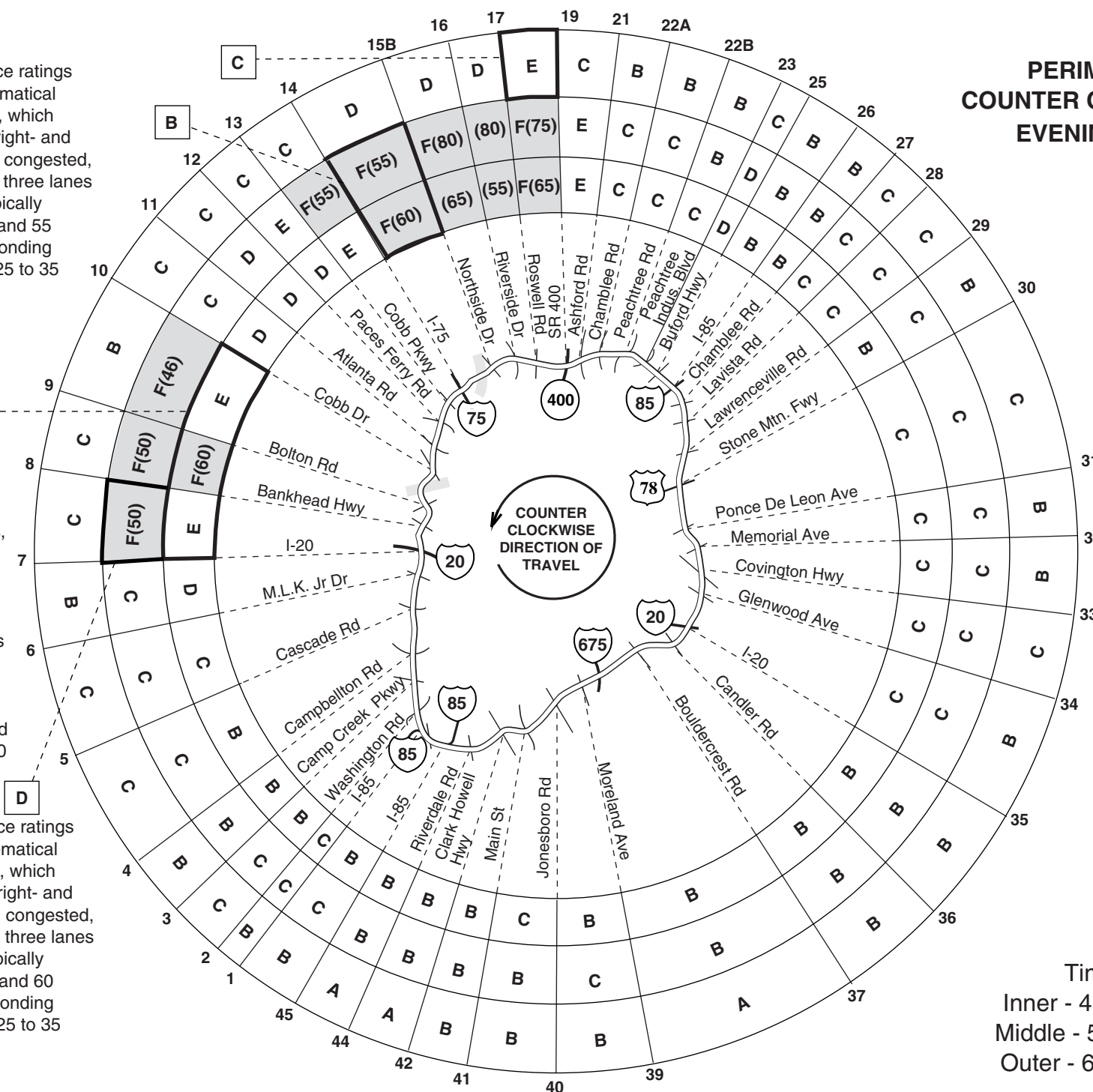
A: These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 55 and 45 pcplpm with corresponding speed estimates of 35 to 50 mph.

D: These level-of-service ratings represent the mathematical average of densities, which varied between the right- and left-hand lane; when congested, densities in the right three lanes approaching I-20 typically ranged between 70 and 60 pcplpm with corresponding speed estimates of 25 to 35 mph.

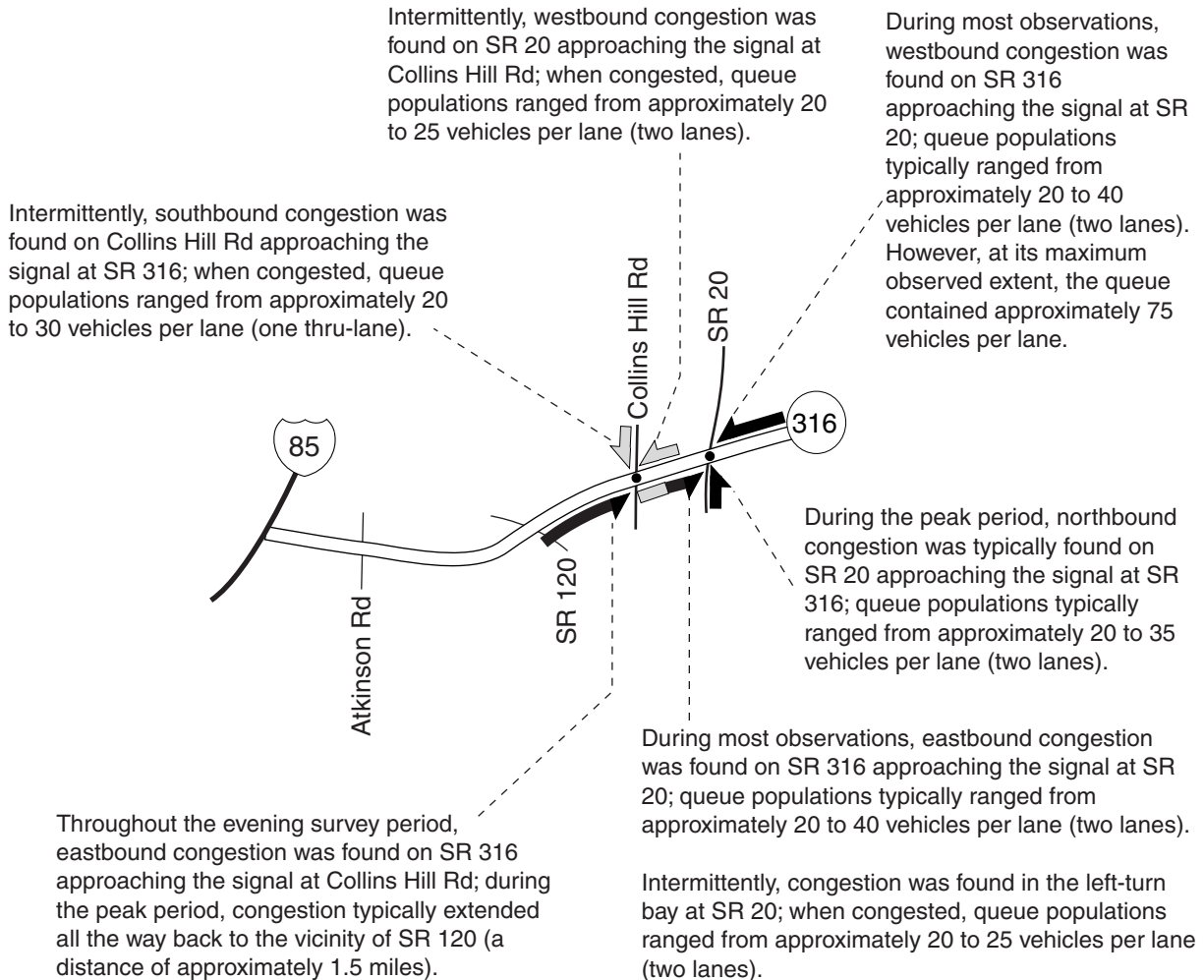
PERIMETER (I-285) COUNTER CLOCKWISE FLOW EVENING (FALL 2001)

C: This level-of-service rating represents the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 75 and 55 pcplpm with corresponding speed estimates of 25 to 35 mph.




Time Rings
Inner - 4:00 - 5:00 p.m.
Middle - 5:00 - 6:00 p.m.
Outer - 6:00 - 7:00 p.m.



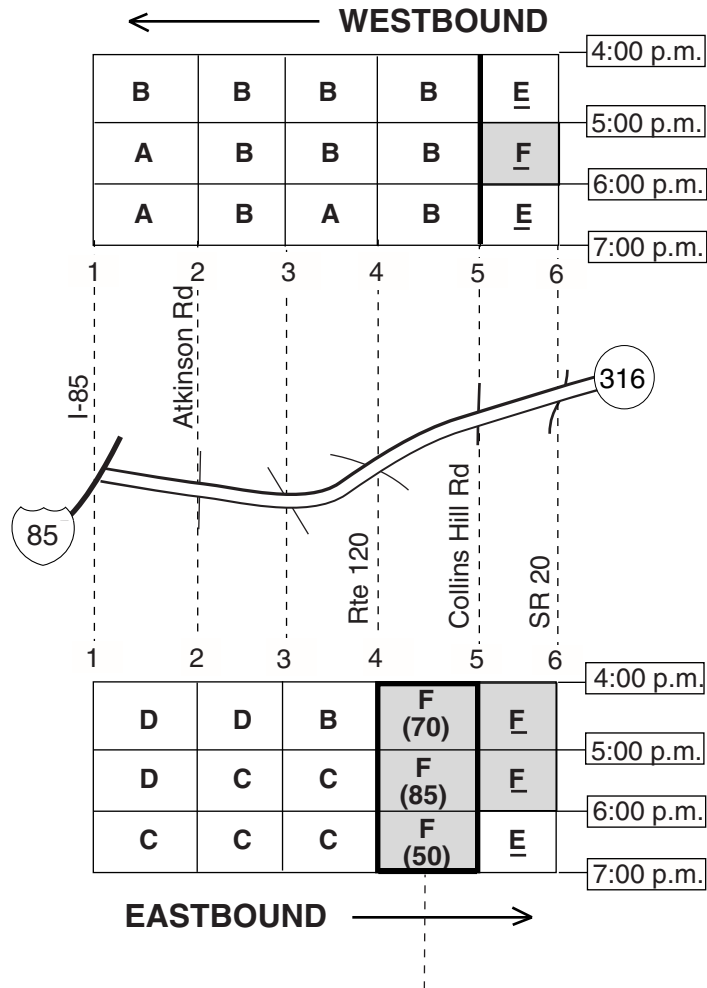
**SR 316
(Gwinnett County)
EVENING (FALL 2001)**



SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

SR 316 **(Gwinnett County)** **EVENING (FALL 2001)**



These level-of-service ratings represent the mathematical average of densities for the entire length of the segment from SR 120 to Collins Hill Rd. However, stop-and-go conditions were typically found along this segment approaching the signal at Collins Hill Rd; the severity and extent of the congestion varied.

LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F			
0	10	20	30	45	65				

Density scale (cars per lane-mile)

Note: F (60) in the tables means level-of-service "F", with density = 60

SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED
A	B	C	D	E	F	

SR 400 EVENING (FALL 2001)

After 5:00 p.m., a two to three mile zone of southbound congestion was typically found on SR 400 between Windward Pkwy and Haynes Bridge Rd; average estimated speeds typically ranged from approximately 25 to 35 mph.

Congestion appeared to be caused or exacerbated by weaving and merging associated with the Haynes Bridge Rd Interchange.

During most observations, congestion was found on the southbound exit ramp at Holcomb Bridge Rd; during the peak period, queue populations approaching the signal at the head of the ramp typically ranged from approximately 35 to 45 vehicles per lane (two lanes).

Intermittently, southbound congestion was found on Dunwoody Pl approaching the signal at Northridge Rd; when congested, queue populations at the signal typically ranged from approximately 20 to 35 vehicles (one thru-lane).

During the peak period, congestion was found on the southbound exit ramp at Northridge Rd; when congested, approximately 25 to 35 vehicles were queued at the signal at the head of the ramp (left-turn lane).

After 5:30 p.m., westbound congestion was found on Hammond Dr approaching the signal at Barfield Rd; when congested, queue populations typically ranged from approximately 20 to 30 vehicles per lane (two lanes).

After 5:00 p.m., a short zone of southbound congestion was found on SR 400 between Abernathy Rd and the Perimeter; average estimated speeds typically ranged from approximately 40 to 45 mph. Vehicles exiting at the Perimeter appeared to cause or exacerbate the congestion.

One day only, southbound congestion was found on SR 400 approaching the toll plaza; approximately 20 to 25 vehicles per lane were queued at the toll plaza (9 lanes open).

Intermittently, eastbound congestion was found on Sidney Marcus Blvd approaching the signal at SR 400; when congested, queue populations typically ranged from approximately 20 to 25 vehicles per lane (two lanes).

Intermittently, congestion was found on the northbound exit ramp at Windward Pkwy; when congested, approximately 20 to 40 vehicles were queued at the signal at the head of the ramp (left-turn lane).

During most observations, an extended zone of northbound congestion was typically found on SR 400 from the vicinity of Northridge Rd to Windward Pkwy; average estimated speeds typically ranged from approximately 15 to 30 mph. The primary bottleneck was the lane drop (3 lanes to 2) at Haynes Bridge Rd.

During most observations, a short zone of severe northbound congestion was found on SR 400 from the vicinity of the SR 407 Loop to the Perimeter; average estimated speeds typically ranged from approximately 5 to 15 mph. The primary bottleneck was located where traffic entered the left lane from the Perimeter and the right lane from the service road. North of the Perimeter, congestion persisted to the vicinity of Northridge Rd; however, average speeds improved (30 to 40 mph).



During most observations, extensive eastbound congestion was found on Abernathy Rd (left lane) approaching the signal at SR 400; it appeared extended delays were incurred by travelers waiting in the queue to enter SR 400 (northbound).

On some days but not others, a one to two mile zone of southbound congestion was found on SR 400 approaching I-85; when congested, average estimated speeds typically ranged from approximately 20 to 40 mph. Congestion appeared to be caused or exacerbated by the merge at the I-85 Interchange.

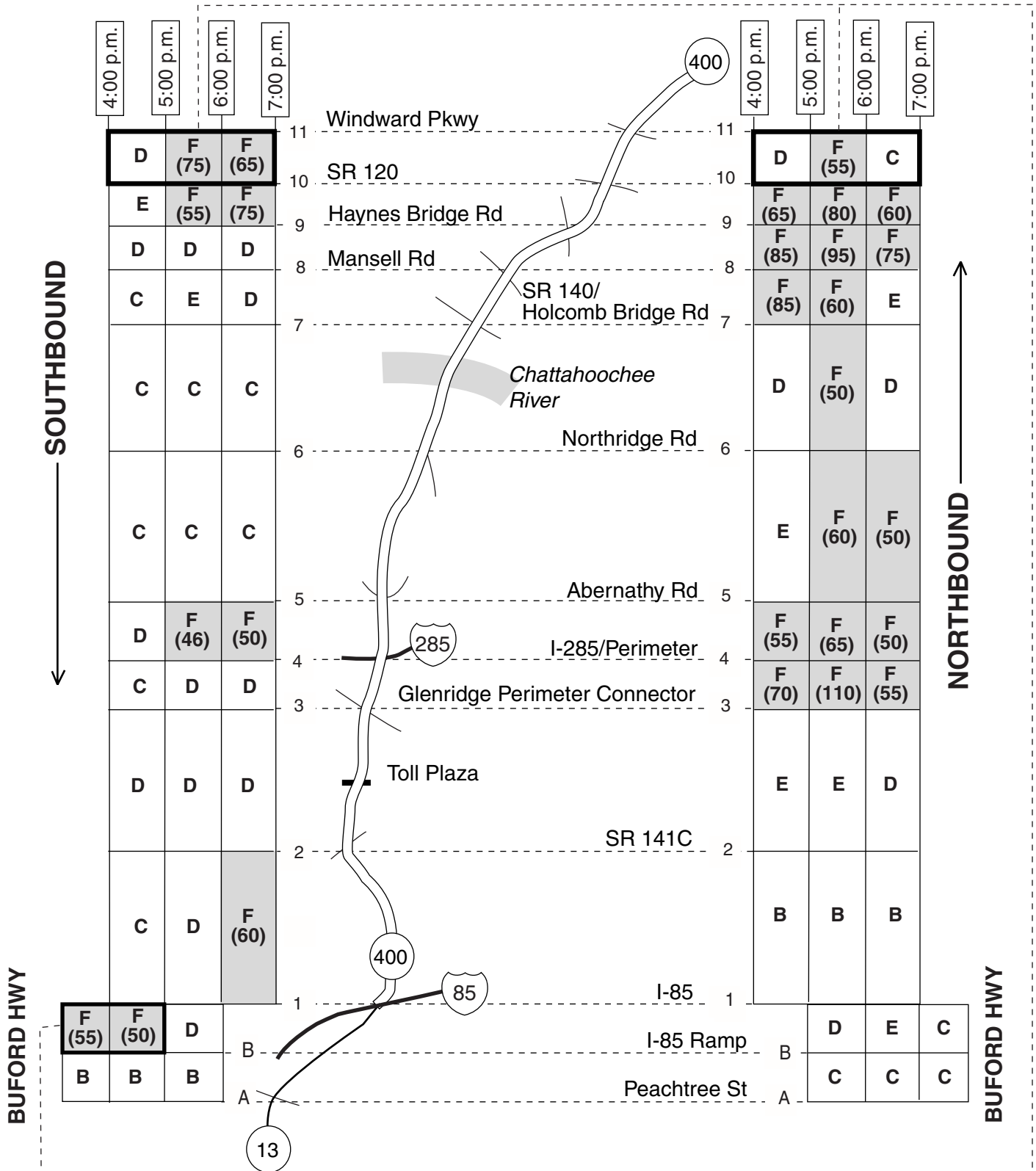
During the peak period, a short zone of northbound congestion was found on Buford Highway between the I-85 entrance ramp and SR 400; average estimated speeds typically ranged from approximately 40 to 50 mph.

On some days but not others, southbound congestion was found on Buford Highway approaching the exit ramp at I-85; when congested, average estimated speeds ranged widely, from approximately 15 to 45 mph. Congestion appeared to be caused or exacerbated by the merge into congested flow on I-85.

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

SR 400 EVENING (FALL 2001)

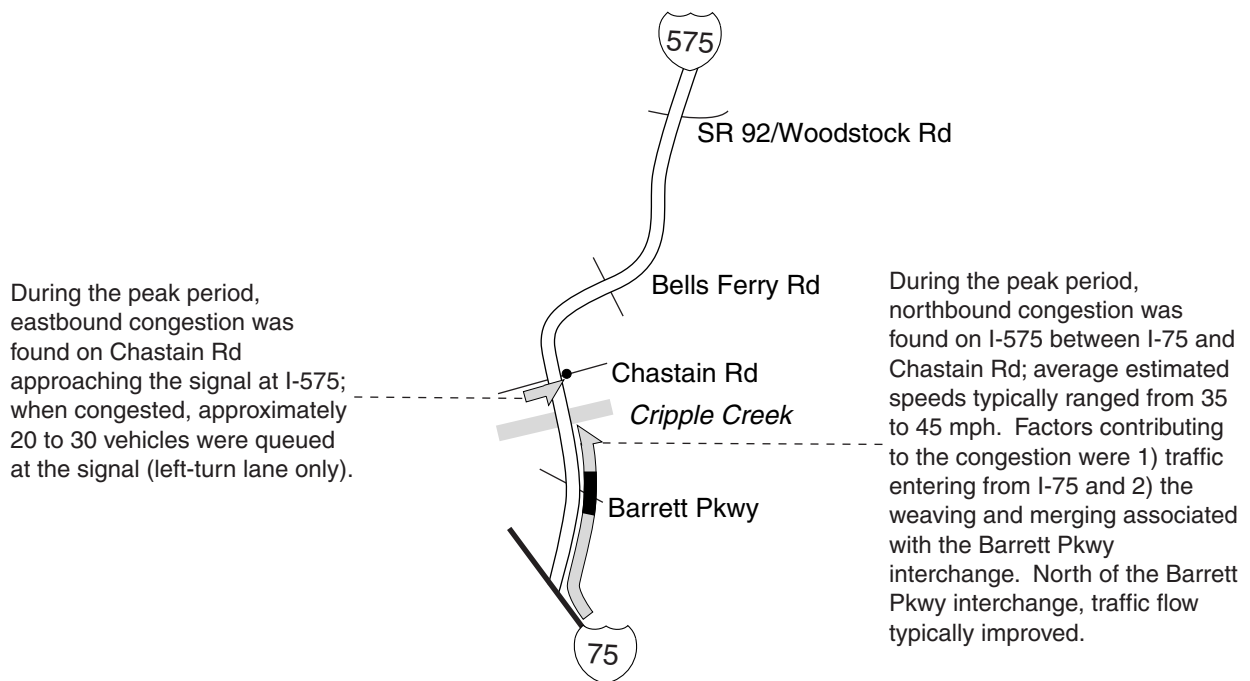


These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities ranged widely, between 95 and 45 pcplpm with corresponding speed estimates of 15 to 50 mph.



These level-of-service ratings represent densities that are based on only one observation per hour; this segment will be surveyed on multiple days by Skycomp in the Spring of 2002.



I-575 EVENING (FALL 2001)

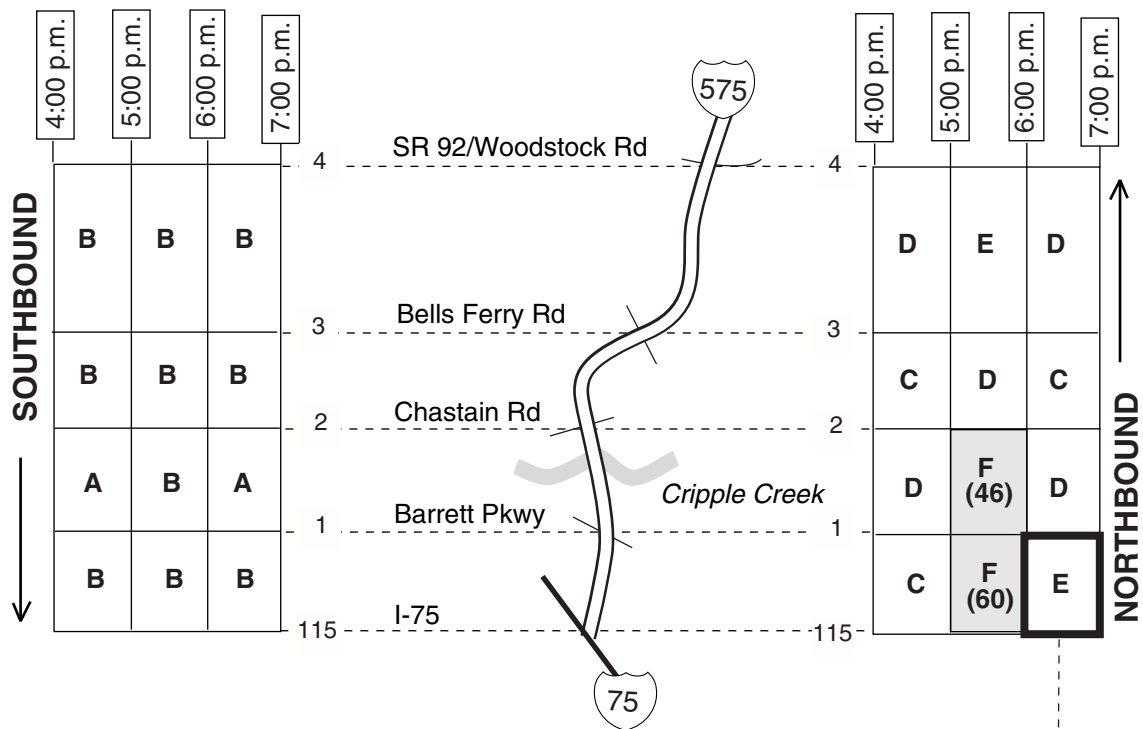


FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)



I-575 EVENING (FALL 1998)



These level-of-service ratings represent the mathematical average of densities, which varied from day-to-day (congested/not congested); when congested, densities typically ranged between 55 and 45 pcplpm with corresponding speed estimates of 35 to 50 mph.

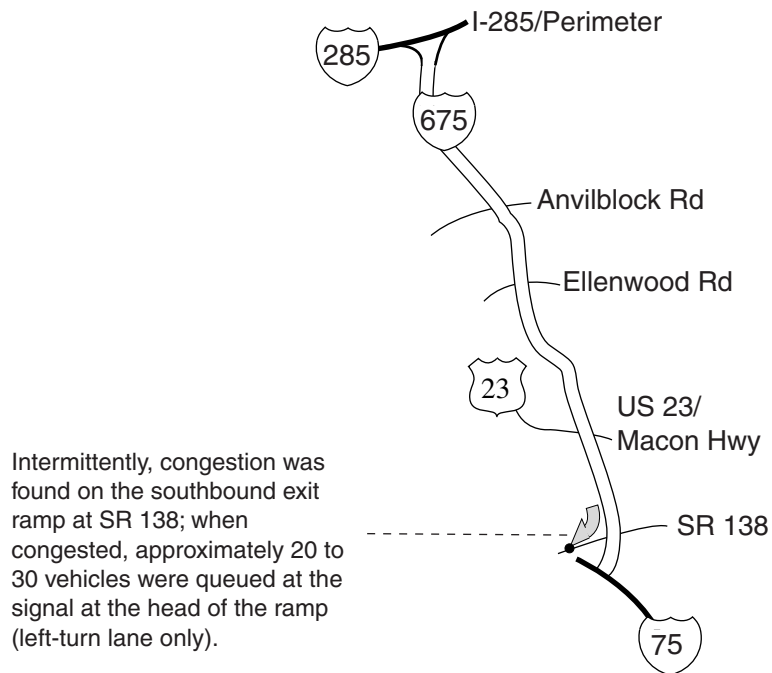
LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F			
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									





I-675 EVENING (FALL 2001)

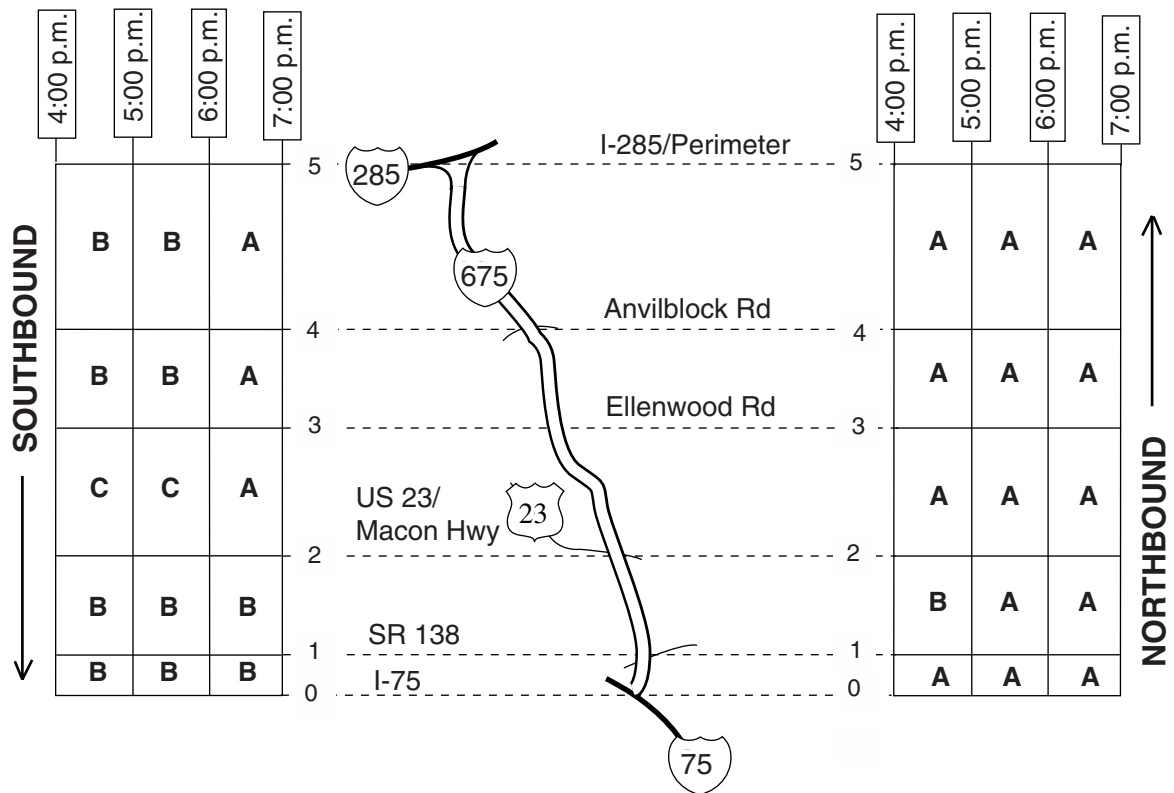
No congestion was found on I-675 during the evening survey period.



FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-675 EVENING (FALL 1998)

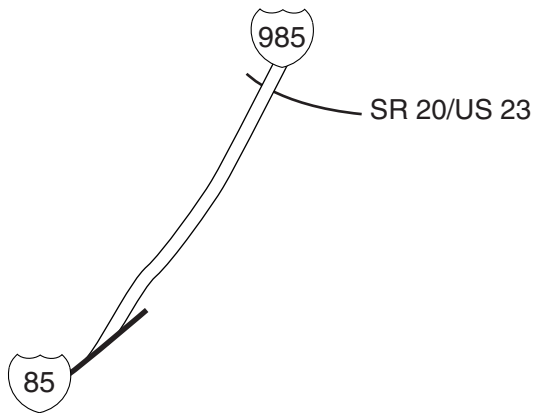


LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				
Density scale (cars per lane-mile)									
Note: F (60) in the tables means level-of-service "F", with density = 60									





I-985 EVENING (FALL 2001)

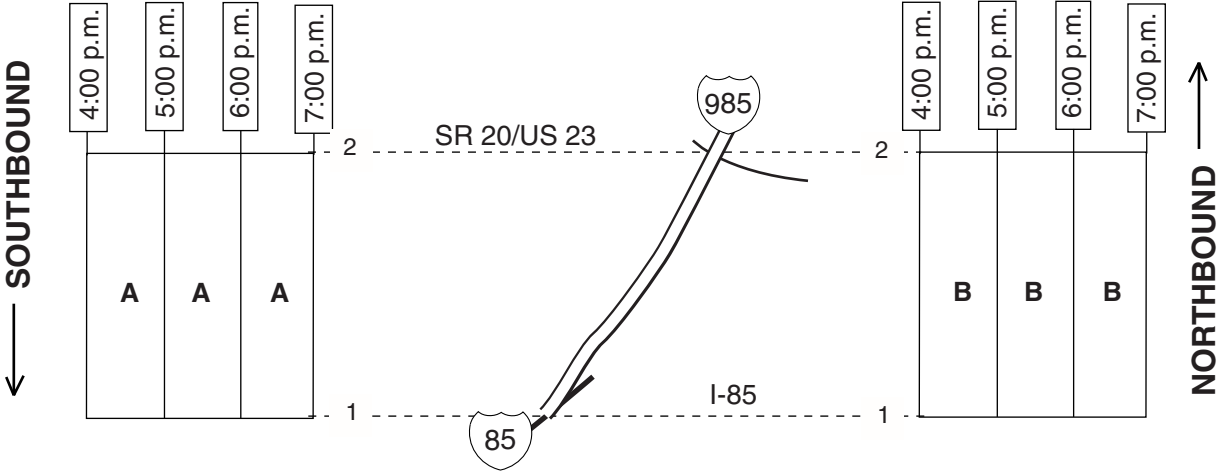


No congestion was found on I-985 during the evening survey period.

FREEWAY TRAFFIC QUALITY

-  Congested flow (Estimated average speed 30-50 mph)
-  Congested flow (Estimated average speed < 30 mph)

I-985 EVENING (FALL 2001)



LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY		CONGESTED		SEVERE	
A	B	C	D	E	F	F	F	F	F
0	10	20	30	45	65				

Density scale (cars per lane-mile)

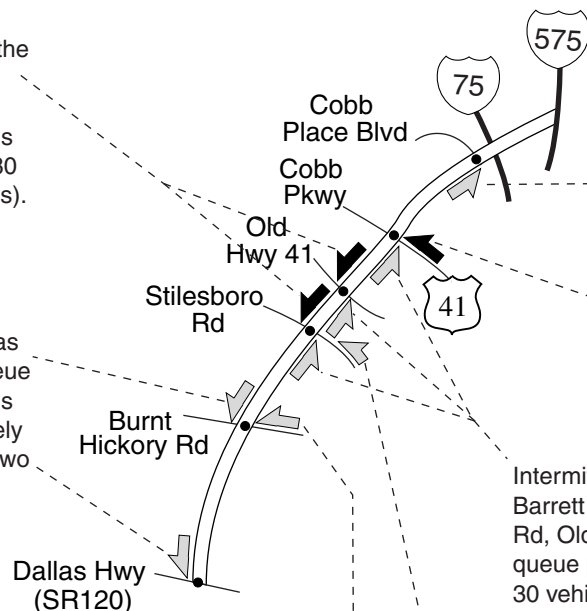
Note: F (60) in the tables means level-of-service "F", with density = 60



RIDGEWAY RD / BARRETT PKWY (Cobb County) EVENING (FALL 2001)

Throughout the evening survey period, southbound congestion was found on Barrett Pkwy between US Rte 41 (Cobb Pkwy) and Dallas Hwy (SR 120); the primary bottlenecks were found at the signals at Old Hwy 41 and Stilesboro Rd. Queue populations at these signals ranged widely, from 20 to 80 vehicles per lane (two lanes).

Farther south, intermittent congestion was found approaching the signals at Burnt Hickory Rd and Dallas Hwy; when congested, queue populations at these signals ranged from approximately 20 to 30 vehicle per lane (two lanes).



Intermittently, northbound congestion was found on Barrett Pkwy approaching the signal just before the I-75 Interchange (Cobb Place Blvd); when congested, queue populations ranged from approximately 20 to 35 vehicles per lane (three lanes).




During most observations, westbound congestion was found on US Rte 41 (Cobb Pkwy) approaching the signal at Barrett Pkwy; queue populations typically ranged from 20 to 40 vehicles per lane (two lanes).

Intermittently, northbound congestion was found on Barrett Pkwy approaching the signals at Stilesboro Rd, Old Hwy 41 and Cobb Pkwy; when congested, queue populations ranged from approximately 20 to 30 vehicles per lane (two lanes). At Old Hwy 41, it appeared the left lane was more congested where vehicles waited to enter the left-turn bay.

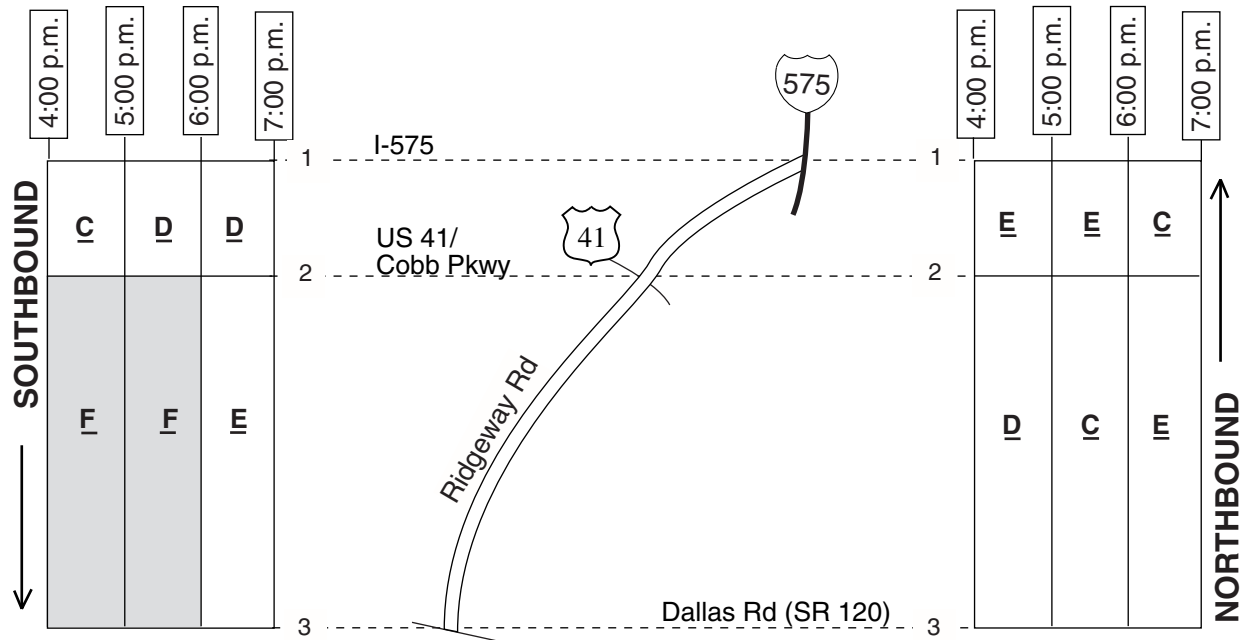
Intermittently, westbound congestion was found on Stilesboro Rd approaching the signal at Barrett Pkwy; when congested, queue populations ranged from approximately 20 to 30 vehicles (one lane).

During the peak period, westbound congestion was typically found on Burnt Hickory Rd approaching the signal at Barrett Pkwy; when congested, queue populations ranged from approximately 20 to 40 vehicles (one lane).

SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

RIDGEWAY RD / BARRETT PKWY
(Cobb County)
EVENING (FALL 2001)



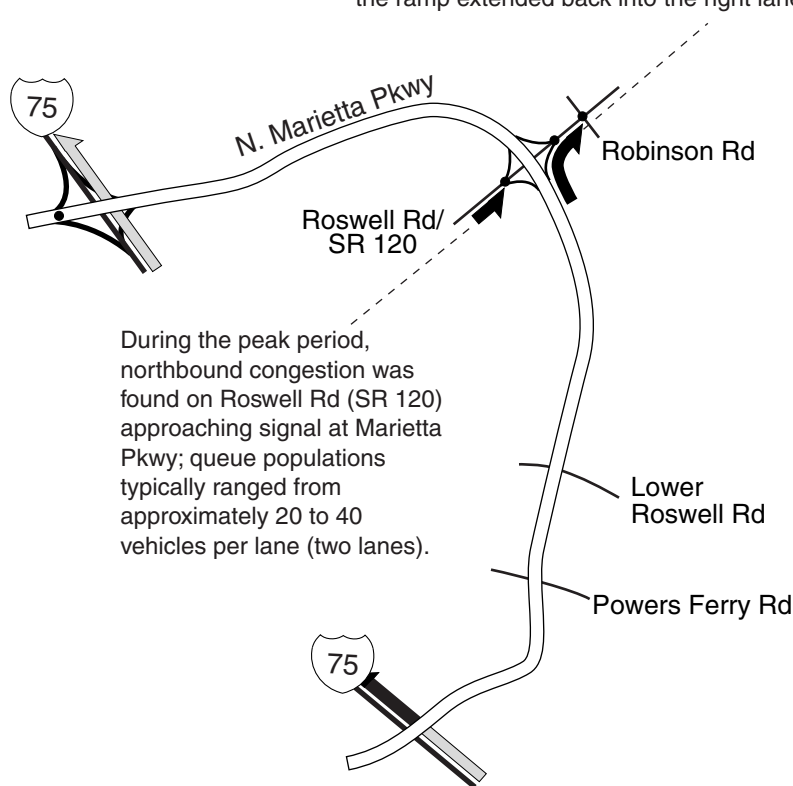
SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F






MARIETTA PKWY (Cobb County) EVENING (FALL 2001)

During the peak period, extensive congestion was found on the northbound exit ramp at Roswell Rd (SR 120); the head of this queue was typically found downstream (northbound) on Roswell Rd at the signal at Robinson Rd. In some cases, congestion on the ramp extended back into the right lane of Marietta Pkwy.

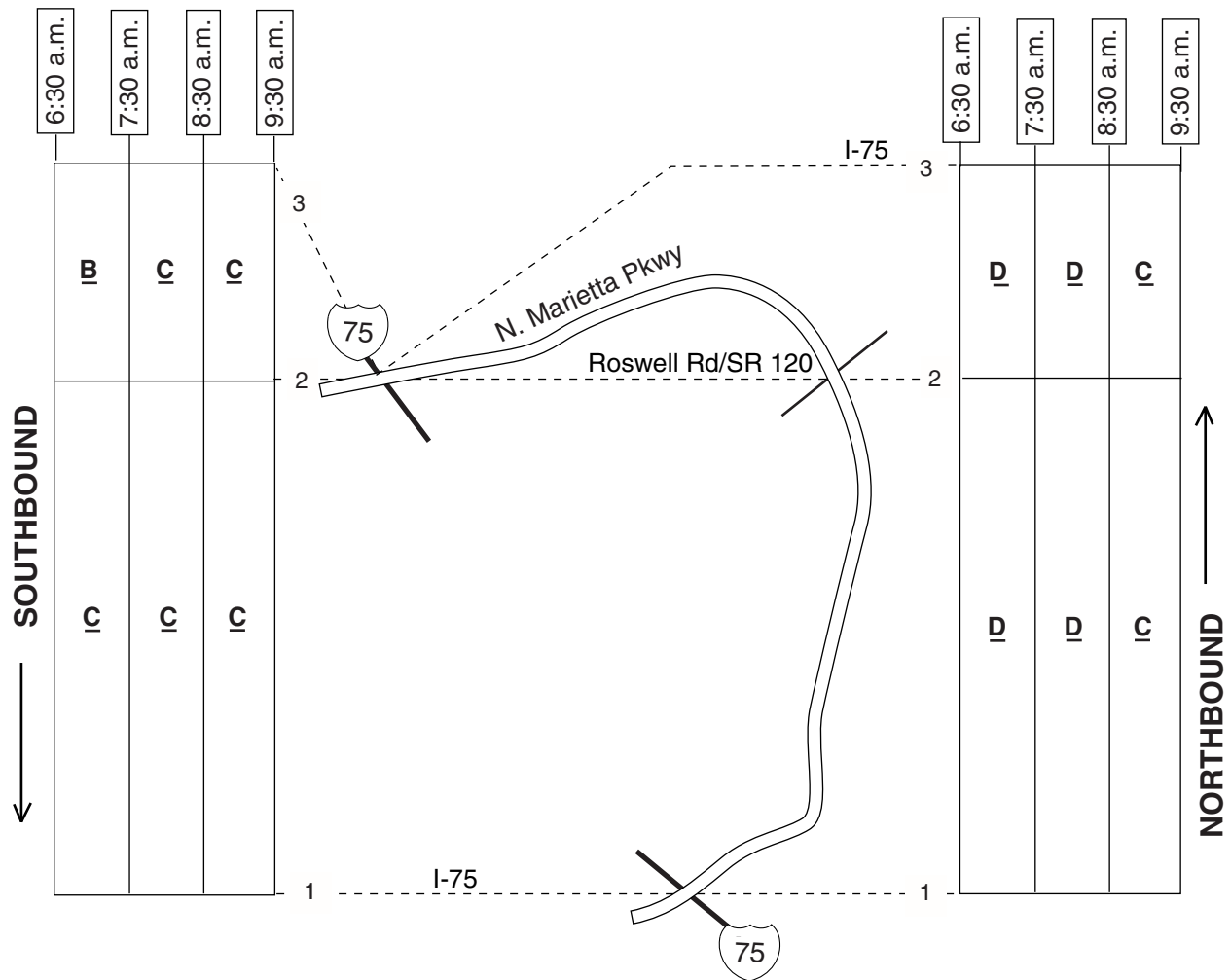


During the peak period, northbound congestion was found on Roswell Rd (SR 120) approaching signal at Marietta Pkwy; queue populations typically ranged from approximately 20 to 40 vehicles per lane (two lanes).

SIGNALIZED HIGHWAY TRAFFIC QUALITY

-  Intermittent congestion or slow moving platoons along a highway segment
-  Congested signalized intersection (intermittent)
-  Congested signalized intersection (continuous)

MARIETTA PKWY (Cobb County) EVENING (FALL 2001)



SURROGATE LEVEL-OF-SERVICE LEGEND:

LIGHT		MODERATE		HEAVY	CONGESTED
A	B	C	D	E	F

APPENDIX A

PROCEDURES FOR DETERMINING FREEWAY LEVEL-OF-SERVICE

METHODOLOGY DESCRIPTION

PERFORMANCE MEASURE: DENSITY-BASED LEVEL OF SERVICE

According to the *2000 Highway Capacity Manual* (the HCM), the defining parameter of freeway level-of-service is density, measured in units of passenger-cars per lane per mile (pcplpm). While densities are commonly calculated from speed and volume data, another method is to measure densities directly from aerial photographs. This is the approach used in the Atlanta survey program.

The LOS rating system uses the letters “A” through “F” to describe traffic conditions: LOS “A” represents superior traffic conditions (very light traffic), while LOS “F” represents poor traffic conditions (congested flow involving various degrees of delay). These letters are assigned based on how densely cars are traveling on the road. Research has shown that for all densities below 40 pcplpm, vehicles generally move at or close to normal highway speed; LOS “A” through “E” represent these densities according to the following table (pcplpm):

- LOS “A”:** densities from **zero to 11** (very light traffic);
- LOS “B”:** densities from **12 to 18** (light to moderate traffic);
- LOS “C”:** densities from **19 to 26** (moderate traffic);
- LOS “D”:** densities from **27 to 35** (moderate to heavy traffic);
- LOS “E”:** densities from **36 to approx. 45** (heavy traffic, but still at speeds close to free-flow)

At densities greater than **40**, speeds typically decrease and traveler delays are incurred. Because flow at all densities greater than **46** (approximately) are regarded as LOS “F”, this report attaches actual densities to all LOS “F” ratings. Accordingly:

LOS “F”:

- Densities from **46 to 60** indicate delay involving minor degrees of slowing; average speeds usually range between 50 and 30 mph;
- Densities from **60 to 80** indicate traffic flow at average speeds usually ranging between 40 and 15 mph;
- Densities from **80 to 100** indicate congested traffic flow, with some stopping possible; average speeds usually range between 10 and 25 mph;
- Densities above **100** indicate severe congestion, with considerable stop-and-go flow likely. For reference, densities above 120 almost always indicate the presence of unusual events (accidents, roadwork, etc.). The practical maximum value for density measurements is **180**; the theoretical maximum value is **264** (at 20 feet per vehicle).

DATA REDUCTION PROCEDURES

From overlapping time-stamped photographs, densities by highway segment were determined by manual counts taken along the entire segment length. Vehicles were classified as cars, trucks, buses, or tractor-trailers when counted; later, passenger-car equivalents (pce's) were derived according to the following table:

<u>Vehicle type:</u>	<u>PCE's:</u>
cars	1
trucks	1.5
tractor-trailers	2.0
buses	1.5

Data that were atypical due to roadwork or to known or suspected incidents were coded for exclusion from the averaging process. All data were then entered into a microcomputer database program, which performed the following tasks: 1) samples were grouped by time slice; 2) average densities were calculated; and 3) densities were converted into service levels "A" through "F". The computer then prepared matrices showing each averaged service level rating plotted by time and highway segment. These data matrices were then copied into the traffic quality tables, which are provided in this report.

In the tables, all LOS F conditions (congested traffic flow) have been outlined and shaded; this permits quick identification of locations experiencing demand at levels exceeding capacity. Because LOS "F" encompasses a wide range of densities, the actual density values are entered next to the "F"; using the travel characteristics in the density ranges provided above, the nature of the flow in LOS F segments can be determined.

While examining the photography, data technicians also identified side streets and on/off ramps that were congested. Where these problems were recurring, descriptive narratives were prepared. These narratives, together with other observations, are provided on "narrative" maps set opposite each traffic quality table.

PROCEDURES FOR DETERMINING ARTERIAL HIGHWAY TRAFFIC CONDITIONS

METHODOLOGY DESCRIPTION

Due to the interrupted nature of traffic flow on signalized highways, density is usually not a preferred performance measure for traffic quality. This is because long segments of roadway often contain few or no vehicles, not for lack of demand, but because vehicles are intermittently held at signalized intersections.

For this and other reasons, the defining parameter for arterial highway level-of-service is travel time over distances of at least one mile in downtown areas and at least two miles in other areas (refer to the *2000 Highway Capacity Manual*). This measure cannot be obtained efficiently across a large region by a fast-moving airplane.

On the other hand, various levels of traffic conditions can easily be seen from above. Trained aerial observers can clearly and consistently differentiate between highways that are lightly, moderately, and heavily traveled. Furthermore, bottlenecks are easily found from above; the more severe the problem, the better it shows up in aerial photographs.

Thus Skycomp has developed a *qualitative* measure of traffic flow on arterial highways, to be applied through examination of 100% overlapping photographic coverage of each highway segment. This methodology and the accompanying rating scale was developed to satisfy the following objectives:

- the rating scale cover the full range of traffic conditions on arterial highways, from empty to densely congested streets, with reasonable gradations in between;
- the methodology be repeatable such that different persons would generally assign the same ratings when viewing the same photographs;
- the ratings are not sensitive to photographs being taken at various points in the signal cycle;
- for ratings that indicate “congestion”, descriptive narratives could be attached which qualify the ratings and which designate supporting photography;
- the methodology be reasonably consistent with the descriptions of the six service levels in the HCM (but without regard to the travel-time criteria, which are the defining parameter).

Because of the last objective, a six-point scale was chosen, also using the letters “A” through “F”. Skycomp’s arterial performance ratings have been underlined in order to designate them as service level surrogates, rather than service level measurements).

Thus the performance rating scale used in this report is defined as follows:

Performance Rating A:

— very few cars using the roadway; or deserted roadway. *[HCM description for LOS A: Vehicles are seldom impeded in their ability to maneuver within the traffic stream; free-flow operations.]*

Performance Rating B:

— light traffic flow; little or no platooning. *[HCM description for LOS B: reasonably unimpeded operations; ability to maneuver only slightly restricted.]*

Performance Rating C:

— moderate traffic flow; not heavy, not light. Platoon populations not greater than 15 vehicles per lane. *[HCM description for LOS C: stable operations; some restrictions to ability to maneuver.]*

Performance Rating D:

— heavy traffic; many cars on the road. Significant queuing at signals, but all should clear on green (less than 20 vehicles per lane queued at all signals). Platoon populations typically between 15 and 25 vehicles per lane. *[HCM description for LOS D: borders on unstable flow where small increases in flow may cause substantial decreases in arterial speed.]*

Performance Rating E:

— congested traffic. Segment may contain one or two intersections with queues of more than 20 vehicles per lane (all may not clear on green). Platoon populations greater than 25 vehicles per lane. On long one-lane segments, the movement of vehicles may resemble a funeral procession, with little opportunity for side-traffic to enter the roadway. *[HCM description for LOS E: significant delays and low average travel speeds; typical causes include adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.]*

Performance Rating F:

— severely congested traffic; includes: vehicles backing through an upstream signal, or for the length of the segment; a series of intersections with more than 20 vehicles per lane queued at each; segment containing one severely congested intersection, with more than 40 vehicles per lane queued approaching the signal (may take two or more signal cycles to clear the intersection). *[HCM description for LOS F: flow at extremely low speeds; high delays and extensive queuing likely at critical intersections.]*

The primary evaluator was trained to view each segment in its entirety (lay out photos side-by-side), and start by testing whether a rating of “C” was appropriate for the segment. Working from this “C” rating, the evaluator could then adjust the rating upward or downward as warranted by the conditions.

In the event that an incident or temporary roadwork significantly affected the rating, the evaluator attached a code which would exclude the affected data from averaging with the results of other days.

After a quality-control review by the project manager, all ratings were digitized and entered into a computer database program for evaluation and averaging. Ratings were printed by time slice and by day, so that unusual ratings could be identified. If there were odd results (for example, “B” ratings on three days and an “F” rating on one day), the photography was checked for possible error or incident. If the data were clearly atypical but a cause could not be identified, a code “u” (“unknown”) was attached to the data (like the incident and roadwork codes, this would also exclude the data from averaging).

Data were then output once again as averages, and entered into the traffic condition tables shown in the main body of the report. It should be remembered that these ratings are averages, and thus a location with intermittently severe congestion may get the same rating as locations with steady less-severe congestion. For this reason, descriptive notes have been provided on the opposing pages, which qualify all “congested” ratings.

APPENDIX B

METHODOLOGY DESCRIPTION

Procedures for obtaining speed/density samples for calibration of the Van Aerde Speed / Density Model

BACKGROUND

In the spring of 1995, Skycomp collected data to compare the speed of vehicles through congested freeway zones with corresponding densities obtained from aerial photographs. The purpose was to explore the relationship between the two, and, given a reasonable correlation, to prepare a model by which vehicle speeds could be estimated from aerial density photographs.

The program was conceived and executed by the Metropolitan Washington (D.C.) Council of Governments (MWCOC). Aerial data were collected by Skycomp; analysis of the data and calibration of the Van Aerde speed/density model were conducted by MWCOC (draft paper included in this appendix).

A secondary objective was to evaluate the accuracy of aerial speed and density measurements by comparing them to data collected by traditional methods (floating cars and loop detectors embedded in the pavement).

Accordingly, segments of freeway were chosen to be surveyed that: 1) were expected to generate congested traffic flow; and 2) either contained a loop detector station or would accommodate quick turnarounds for multiple floating car runs. Thus, while data were being collected in the air (290 speed samples were obtained from the air, along with corresponding densities), loop detector or floating car data were collected concurrently on the ground.

The outcome of this study was a finding that travel speeds across congested freeway segments could be determined with reasonable accuracy using only aerial density photographs. It was also found that speeds and densities obtained through aerial techniques closely matched data obtained using the traditional ground methods.

PROCEDURES TO OBTAIN SPEED / DENSITY SAMPLES:

The observer/photographer followed the following procedure to obtain all speed/density samples: he first flew along the selected survey segment while taking time-stamped overlapping density photographs of the entire segment; next, at the upstream end, he selected a target "floating" car for tracking; he photographed the target as it entered and departed the segment, while simultaneously timing its run to the nearest second. He then took an "after" density photo set; and then recorded the following information on a clipboard: the time of the sample, the target vehicle description, lane(s) traveled, elapsed time, and any special notes. This procedure was repeated for each speed/density data point.

In the actual course of sampling, this procedure was modified in several ways. First, where cars were moving at high (free-flow) speeds, the density did not change significantly between samples; thus sometimes three or more floating cars were timed between density runs.

Another modification done in-flight is as follows: the observer noted in several cases that the density set taken before the target vehicle went through better reflected the conditions the car encountered than the density set taken after the vehicle went through (or vice versa). This was usually due to a delay in changing film, extra maneuvering the airplane, or any other event which delayed the “after” density sample for several minutes after the completion of the run. While normally the density associated with each speed sample was an average of the “before” and “after” density sets, in these cases only the “before” or “after” density set would be used (as directed by the observer).

With regard to selection of target vehicles, the plan was to select cars that reflected the average speed of traffic, just as floating car drivers are instructed to approximate the speed of traffic flow. Fortunately, vehicles have little freedom to choose their speeds in the congested density ranges (above 40 pcplpm). So, for example, almost any vehicle in a congested traffic stream in the middle lane of three will give a suitable floating car measurement. Even tractor-trailers (unless heavily loaded and traveling uphill) moved at the same speed as passenger cars. Thus the criteria the observer used in selecting each target vehicle was 1) is it in the correct lane; and 2) does the vehicle stand out so that it is easy to keep track of?

Also, in the event that the highway had four travel lanes in one direction, alternating samples were taken from both middle lanes.

In the event that a driver switched lanes while being tracked, the observer noted the lane change and also noted which lane the car spent the majority of time in (this is the lane for which a density count would be made later). In several cases (infrequently), the observer abandoned tracking certain vehicles when: 1) the driver made multiple lane changes, trying to beat the average speed of traffic; 2) the driver switched lanes and changed speeds obviously and significantly; 3) the vehicle turned out to be a heavily loaded truck which delayed the traffic stream; or 4) the observer “lost” the vehicle being tracked. Also, for the samples made with traffic traveling at free-flow speeds, vehicles were abandoned which proved to be traveling significantly faster or slower than the average speed of traffic.

In the event that the target vehicle moved to the right lane in apparent preparation to exit, the observer often was able to switch tracking to another vehicle that had been just behind or ahead of the original vehicle in the same lane (and used the newly adopted vehicle to complete the sample). This was necessary because in some cases six or seven minutes had been invested in the tracking of a specific vehicle, and it was important to avoid wasting that time where possible.

It should also be pointed out that speeds were not tracked for very slow moving queues (densities over 120 / MWCOG samples only). Instead, density runs were made at 5 or 10 minute intervals, such that later on the ground the same vehicles could be found in succeeding sets of density photos; this allowed computation of speeds and associated densities.

DATA PROCESSING

After each flight, a topographic map was prepared for each zone which showed the starting and stopping points for each tracked car. Measurements were then made of the segment length (distance traveled). Then each tracked vehicle was entered into the computer database, including:

1. vehicle description
2. time-of-day
3. initial lane and subsequent lane changes
4. precise travel time (from stopwatch or time-lapse photographs)
5. density-photo preference, if any (default was to average the before- and after- density samples)
6. any special notes pertaining to that vehicle.

After the photos had been processed, each set of overlapping “density” photographs was taped together into a “mosaic” that showed each entire segment. Then vehicles in the required lane(s) were counted, listed by “car”, “truck”, “tractor-trailer” and “bus”. These totals were translated into passenger-car equivalents (PCE’s) using the following values:

<u>Vehicle type:</u>	<u>PCE’s:</u>
cars	1
trucks	1.5
tractor-trailers	2.0
buses	1.5

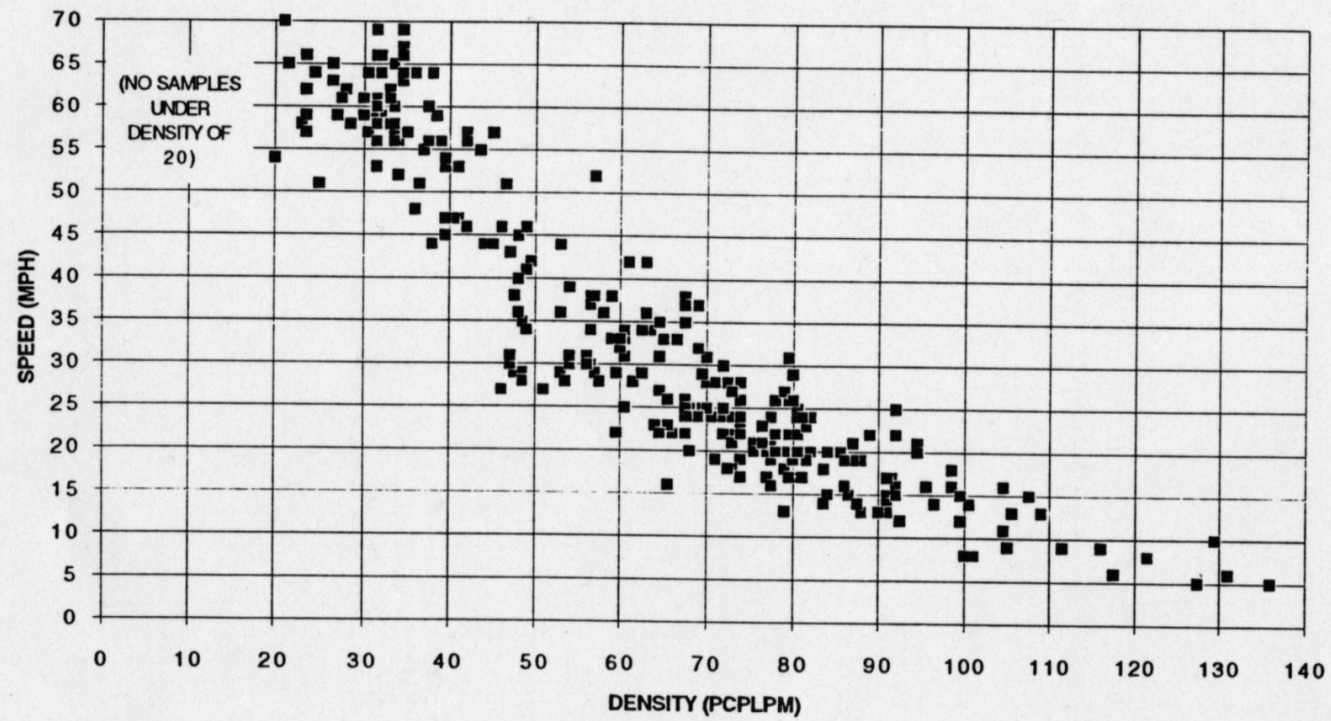
(It should be noted that the distinction between “cars” and “trucks” could not be cleanly made, since there are many varieties of light and heavy pick-ups (both covered and uncovered). In general, a pick-up or van had to be at least twice the size of an average-sized car to be considered a “truck”.)

PCE’s were then divided by segment length to calculate densities. These density samples were then matched to corresponding speed samples; each speed/density data pair was then plotted on the chart.

CALIBRATION OF THE VAN AERDE MODEL

The latest draft of the MWCOC paper describing the calibration of the Van Aerde Speed / Density Model for the Washington D.C. metropolitan area is provided next. This paper was authored by Paul DeVivo, the member of MWCOC staff who performed the analysis.

ALL SKYCOMP DATA SAMPLES



The main advantages to a single-regime model are that boundaries between regimes do not have to be defined; and curves from adjacent regimes do not have to be spliced at the boundaries. A single-regime model allows for a more subjective and repeatable calibration process. This will be especially true if more data from the high-speed end of the curve is ever incorporated into this process.

The disadvantages to this particular model are that it expresses this project's independent variable as a function of the dependent variable; and that it is a non-linear function. These disadvantages make performing the initial calibration more difficult. However, once SAS programs for the task are written, they can be used again usually with a minimum of effort.

The procedure for calibration was as follows: 1) The model's equation was coded into a spreadsheet so that the shape could be defined by recognizable parameters: two points that the curve passes through, the free-flow speed, and the speed at capacity. By overlaying this curve with the scatter plot of the observations, initial estimates of the parameters were made. 2) The initial parameter estimates, the equation, and the observations were used in a SAS PROC NLIN job to machine-calibrate the parameter estimates. 3) A second SAS program translated the calibrated equation into a look-up table that expresses speed as a function of density. 4) The results of the SAS work were imported into a spreadsheet for plotting and for calculation of prediction intervals.

Two outstanding technical issues related to this procedure are determination of the free-flow speed, and calculation of prediction intervals.

The free-flow speed for best fit can be determined by the PROC NLIN program, as are all other parameters. Due to the lack of data at the low-density region of the model, PROC NLIN returns a very high free-flow speed. Additional data from MD SHA was used to calculate a free-flow speed for general application on the Beltway. The calibration of the model presented here resulted from forcing the free-flow speed to match the SHA data analysis.

The prediction intervals shown in the current plot were calculated after the model was translated. This may have not been appropriate. PROC NLIN calculates prediction intervals directly as it calibrates the model. Those prediction intervals express density as a function of speed, however. Work is in progress to translate them, and to otherwise arrive at the most appropriate method of determining prediction intervals.

Since a single-regime model is more suitable in a computerized process, and for lack of significant difference in performance, the Van Aerde model is preferred over earlier approaches examined by MWCOG staff and presented before subcommittees.

Van Aerde Single Regime Model
DRAFT--2 May 1996

This model was developed by Michael Van Aerde and described in TRB Paper No. 950802. It differs from the models already presented in two significant respects: 1) The Van Aerde model expresses headway or density as a function of speed instead of speed as a function of density; 2) The Van Aerde model's single regime is continuous for the entire speed range from jam to free-flow.

The model is:

$$D = 1 / (c1 + c2 / (Sf - S) + c3 * S)$$

where:

D = Density (vehicles/lane/mi)

Sf = Free-flow speed (mph)

c1, c2, c3 = coefficients

S = Speed (mph) -- INDEPENDENT VARIABLE

The model was calibrated for local use by MWCOG staff. Maryland SHA ATR data from stations on the Capital Beltway was used to determine the free-flow speed. Skycomp aerial speed/density observations were used to calibrate the coefficients.

The calibration resulted in the curves shown in the attached graphics: Speed vs. Density; Flow Rate vs. Density; Speed vs. Flow Rate; and Speed Residuals vs. Density.

The coefficients required to plot the Density vs. Speed curve are 0.00512, 0.0144, and 0.000342, respectively. The free-flow speed is 67 mph. All trucks were weighted as 2.5 cars. The upper and lower bounds shown on this plot are 95% prediction intervals.

Speed-Density Calibration
Van Aerde Single Regime Model

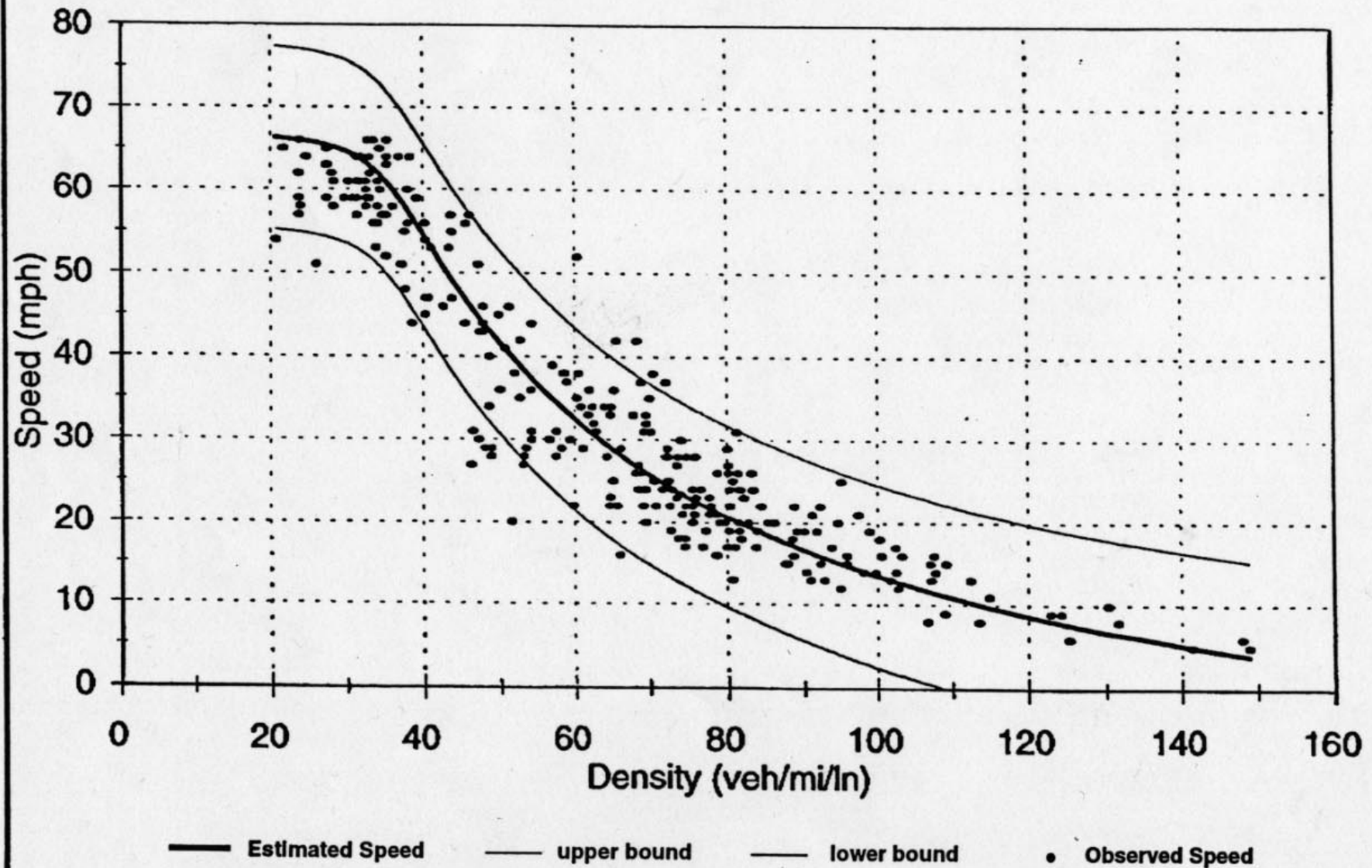
free-flow spd = 67 mph / c1 = 0.00512 / c2 = 0.0114 / c3 = 0.000342

	DENSITY (veh/ln/mi)	SPEED (mph)	VOLUME (veh/ln/hr)
free-flow	0	67.0	0
	20	66.4	1,328
	25	65.8	1,661
	30	64.6	1,946
	35	61.3	2,144
capacity	39	55.8	2,190
	40	54.7	2,189
	45	47.8	2,153
	50	41.9	2,094
	55	36.8	2,025
	60	32.6	1,954
	65	28.9	1,880
	70	25.8	1,806
	75	23.1	1,731

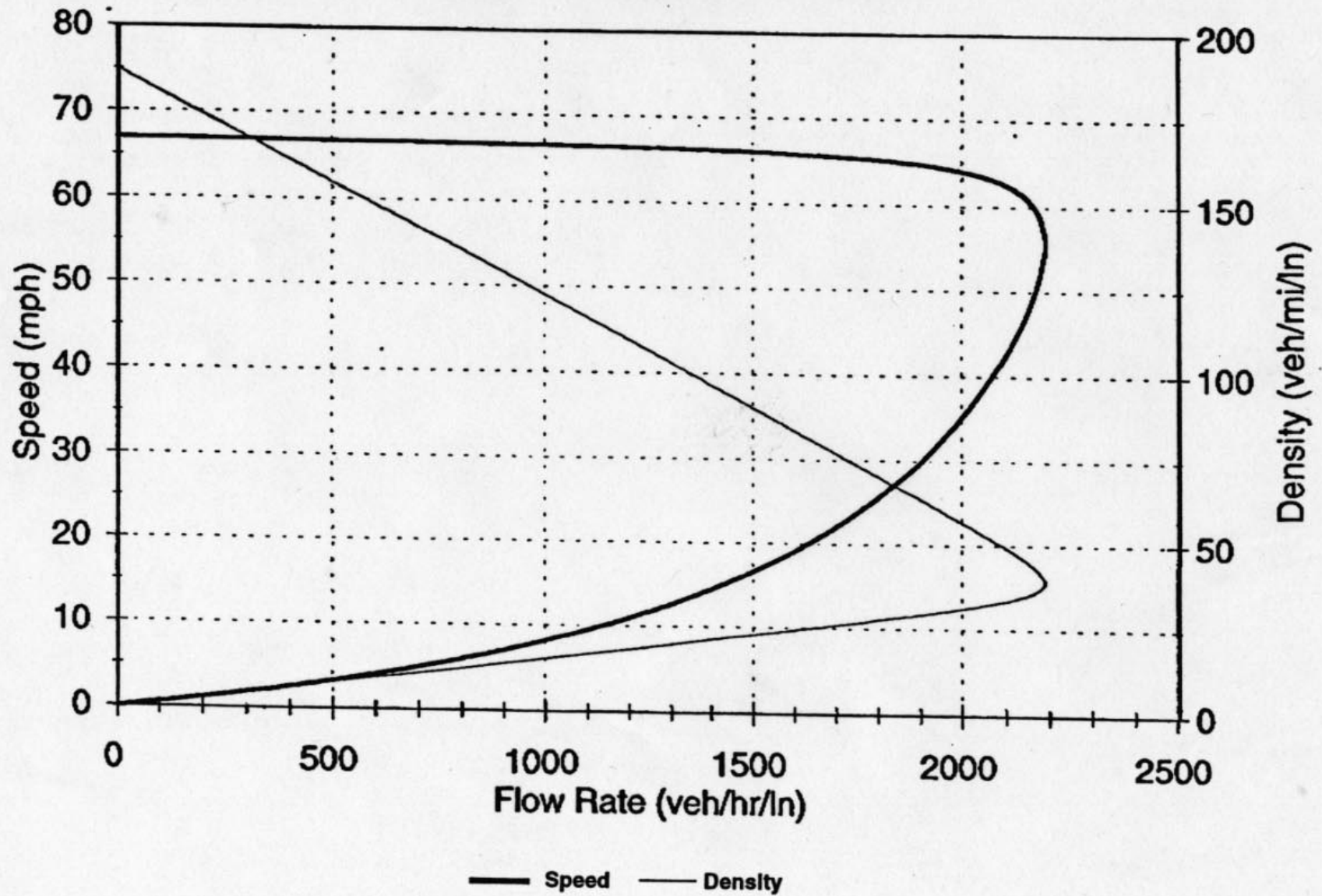
DENSITY (veh/ln/mi)	SPEED (mph)	VOLUME (veh/ln/hr)
80	20.7	1655
85	18.6	1580
90	16.7	1503
95	15.0	1425
100	13.5	1350
105	12.1	1271
110	10.9	1197
115	9.7	1117
120	8.7	1043
125	7.7	963
130	6.8	885
135	6.0	810
140	5.2	729
187	0	0 jam

Draft 15 February 1996

Speed-Density Calibration Van Aerde Single Regime Model



Speed-Density Calibration Van Aerde Single Regime Model



Speed-Density Calibration
Van Aerde Single Regime Model

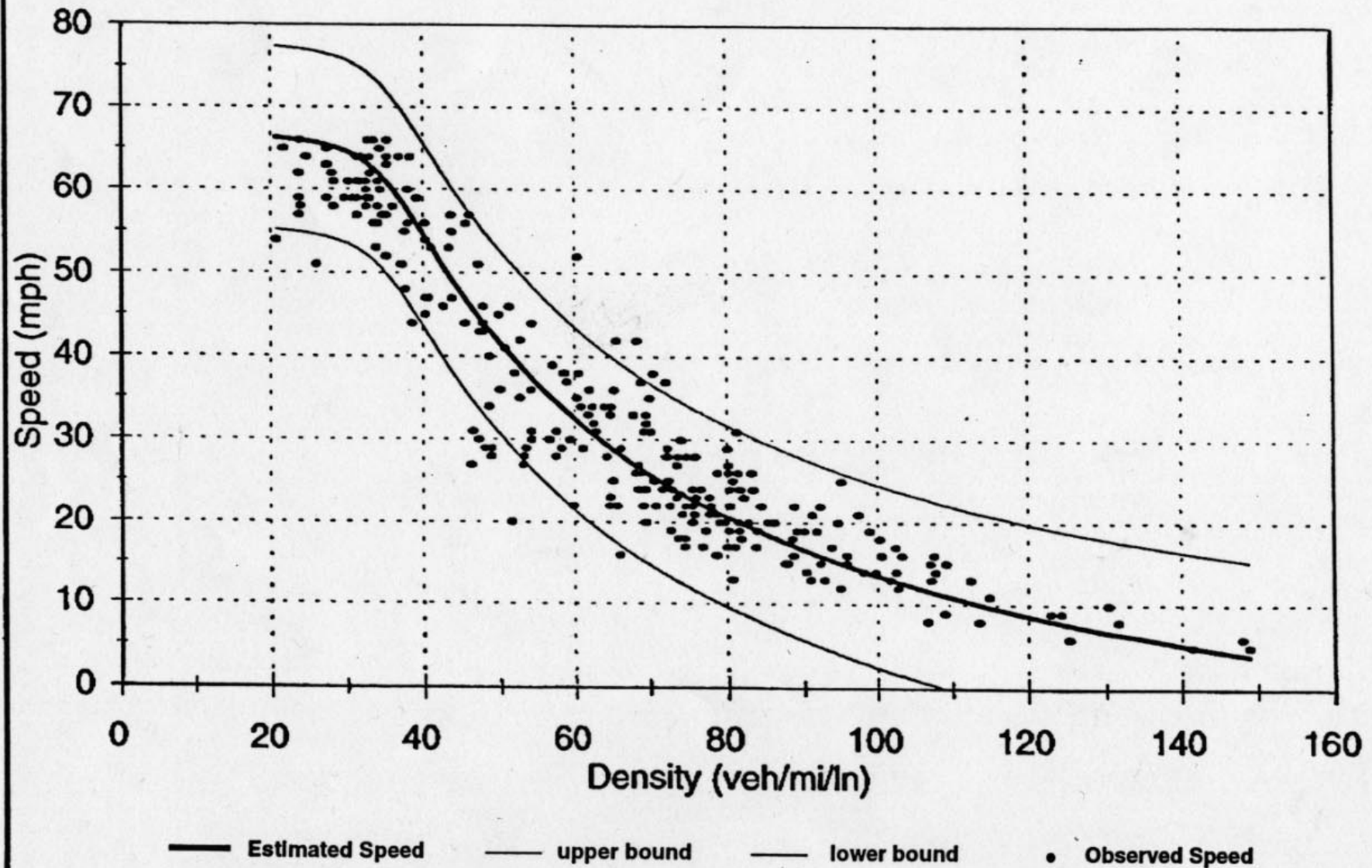
free-flow spd = 67 mph / c1 = 0.00512 / c2 = 0.0114 / c3 = 0.000342

	DENSITY (veh/ln/mi)	SPEED (mph)	VOLUME (veh/ln/hr)
free-flow	0	67.0	0
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	50	41.9	2,094
	55	36.8	2,025
	60	32.6	1,954
	65	28.9	1,880
	70	25.8	1,806
	75	23.1	1,731

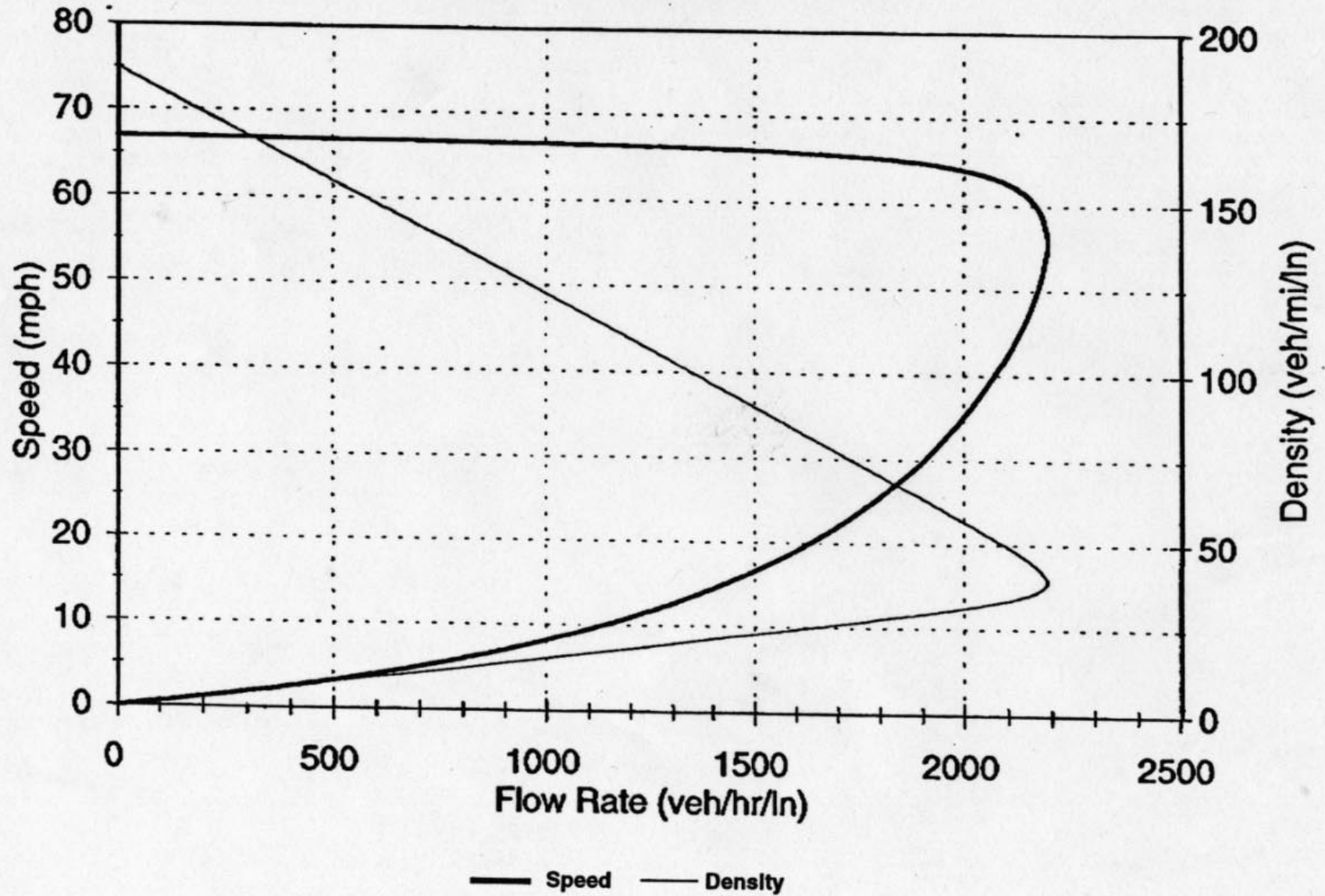
DENSITY (veh/ln/mi)	SPEED (mph)	VOLUME (veh/ln/hr)
80	20.7	1655
85	18.6	1580
90	16.7	1503
95	15.0	1425
100	13.5	1350
105	12.1	1271
110	10.9	1197
115	9.7	1117
120	8.7	1043
125	7.7	963
130	6.8	885
135	6.0	810
140	5.2	729
187	0	0 jam

Draft 15 February 1996

Speed-Density Calibration Van Aerde Single Regime Model



Speed-Density Calibration Van Aerde Single Regime Model



APPENDIX C

FLIGHT DIRECTORY

<u>FLIGHT NO.</u>	<u>DATE</u>	<u>DAY OF WEEK</u>	<u>AM / PM</u>
1	Oct 15	Monday	Evening
2	Oct 16	Tuesday	Evening
3	Oct 17	Wednesday	Evening
4	Oct 18	Thursday	Evening
5	Oct 22	Monday	Evening
6	Oct 23	Tuesday	Evening
7	Oct 24	Wednesday	Evening
8	Oct 25	Thursday	Evening
9	Oct 30	Tuesday	Morning
10	Oct 30	Tuesday	Evening
11	Oct 31	Wednesday	Morning
12	Oct 31	Wednesday	Evening
13	Nov 1	Thursday	Morning
14	Nov 1	Thursday	Evening
15	Nov 2	Friday	Morning
16	Nov 7	Wednesday	Morning
17	Nov 8	Thursday	Morning
18	Nov 9	Friday	Morning